AFOEHL REPORT 89-049EH0101FNA


# Community Noise Survey of AF37/T-10 Hush Houses, Langley AFB VA



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JUNE 1989

## Final Report



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This report provides results of the survey of the AF37/T-10 Hush Houses at Langley AFB performed on 27-31 Jan 89 by AFOEHL. The base Bioenvironmental Engineering Service, 1 Medical Group/SGPB, requested this noise study to confirm their tentative conclusion that T-10 hush house operations are the cause of complaints of a civilian. The civilian contends hush house operations are vibrating his house and thus disturbing him and his wife, as well as causing damage to his house. The condition of the two T-10 hush houses, as well as the background of problems with their installation, is discussed. The results of noise measurements taken at selected points 250 feet from each hush house under various operating conditions show the hush houses did not meet the design noise criteria. Measurements taken at the complainant's property and at another house in the community showed the wind is causing the low frequency energy to be directed downwind to produce an intermittent problem in the community. Recommendations are made to operate in the short term under wind conditions which do not create community problems. The long term solution is to repair the hush houses.

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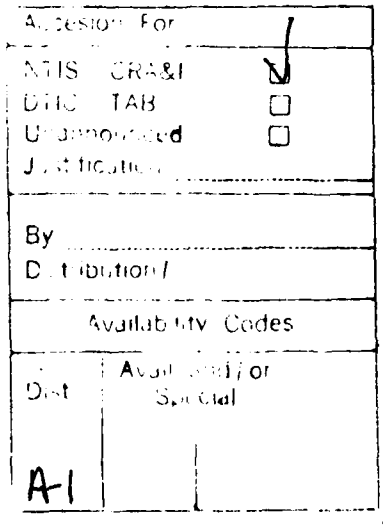


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## 1. INTRODUCTION

A. Purpose: This report provides results of the survey of the two AF37/T-10 Hush Houses at Langley AFB performed on 27-31 Jan 89 by AFOEHL. The base Bioenvironmental Engineering Service, 1 Medical Group/SGPB, requested this noise study to confirm their tentative conclusion that T-10 hush house operations are the cause of complaints by Mr Miller, a civilian. The base requested we define and provide a solution to the problem.

B. Problem: Mr Miller contends Hush House operations are vibrating his house. Not only is this disturbing him and his wife, but he claims this has caused damage to his house. Aircraft maintenance operations are under a restricted work schedule to reduce night time complaints, creating a maintenance backlog.

C. Scope: The condition of the two T-10 hush houses, as well as the background of problems with their installation, is discussed. The results of noise measurements taken at selected points 250 feet from each Hush House under various operating conditions are reported. Measurements taken at the complainants property and at another house in the community are also examined. Recommendations are made for both a short term and long term solution to abate the problem.

## II. DISCUSSION

A. Standards.

1. T-10 Hush Houses. Acceptance testing for noise on T-10 hush houses consists of performing measurements at 20 locations on two 250 foot semi-circular arcs as shown in Figure 1. The A-weighted sound level should not exceed 80 dB at any of these positions. It is necessary to control not only audible noise, but low-frequencies which may induce vibrations in surrounding structures. Hush houses reduce audible noise by transferring considerable energy from the audible to the subaudible frequency range. Infrasound, frequencies below 30 Hz, are not perceived well by the human ear and people do not usually notice these frequencies unless the levels are very high. These low frequencies produce no adverse health effects below 145 dB. However, when sufficient energy is transmitted it may be felt directly or the vibrating material may produce audible sounds. The adverse effects of this low frequency energy are controlled by the use of siting criteria to ensure buildings are not within the zone of influence of these effects. The zones of influence, or guidelines for minimum distances, are as shown in Table 1. These zones of influence are based upon a worst case comparison of vibration analyses and a survey of base complaints and are not blanket criteria.

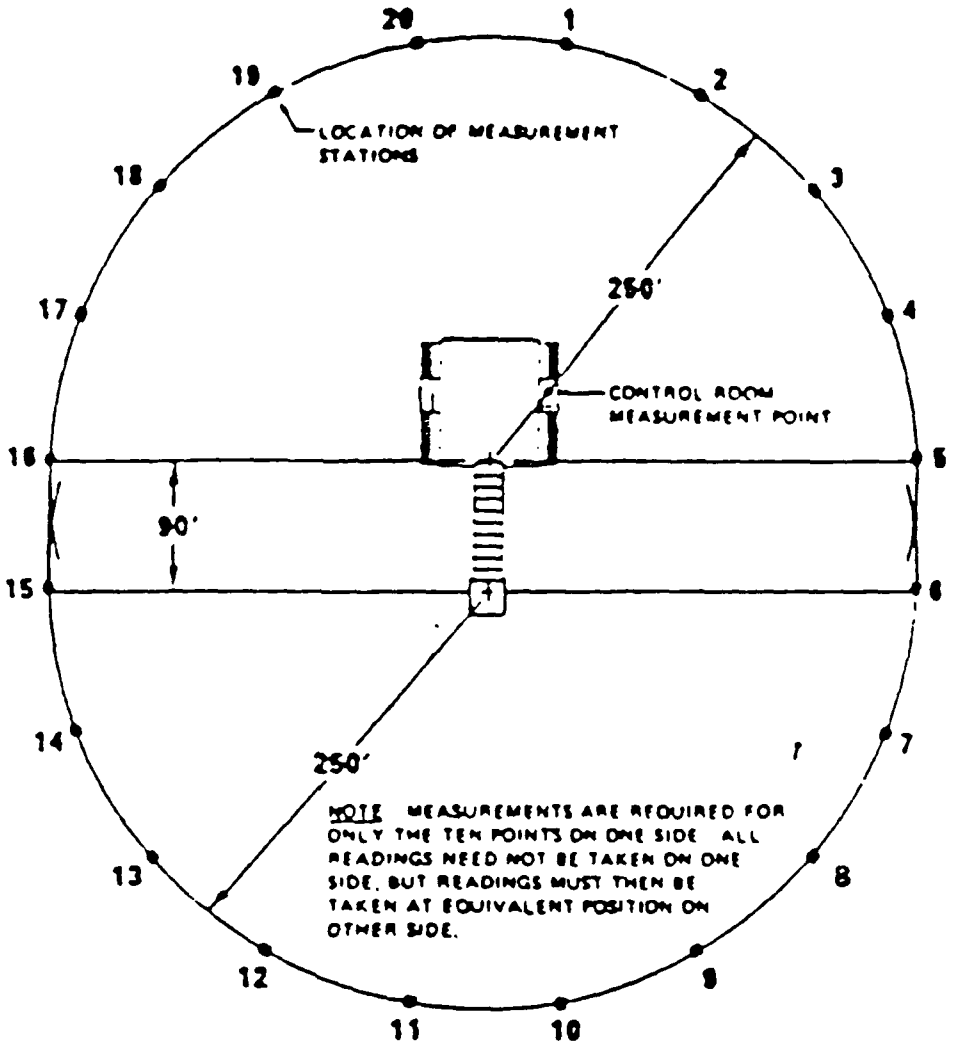



**Figure 1. Acceptance Test Noise Measurement Points**

**Table 1. Zones of Influence (1:118)**

| Building Function | Distance (ft)* |
|---|---|
| Workshop (full-time occupancy) - Masonry with 15-25% door and window openings ** | 550 |
| Prefabricated steel buildings | |
| single story | 500 |
| Office - masonry with 15-25% door and window openings ** | |
| single story | 500 |
| multi-story | 1000 |
| Vibration sensitive equipment (e.g., optical microscopes, photo interpretation light tables) | |
| single story/concrete block | 500-1000 |
| single story/prefab steel | 1000 |
| multi-story/prefab steel | 2000 |
| Residential/Community *** | |
| community | 1000-3000 |
| housing | 2000 |
| medical | 3000 |

* Radial distance as measured from both ends of exhaust tube
** Using a weighting factor of 1 to adjust for different building functions per ANSI S3.29-1983.
*** HQ AFLC/DEPV, "Interim Site Planning Guidance for Aircraft Jet Engine Hush House Facilities," 10 July 1984.

2. Community Noise. The Environmental Protection Agency published a report (1) which outlines equivalent sound levels to protect public health and welfare. A summary of these recommendations is shown at Table 2. The table identifies a 24-hour equivalent A-weighted sound level (Leq) of 70 dB to protect public health (primarily to prevent hearing loss) and a day-night average sound level (Ldn) of 55 dB(A) outdoors to prevent activity interference in residential areas with outside space and farm residences. Table 3 shows the exclusion distances based on human effects for maximum sound pressure levels.

## Table 2. Yearly Average Sound Levels Identified to Protect the Public Health and Welfare with an Adequate Margin of Safety (2:29)

| | Measure | Indoor Activity Interference | Indoor Hearing Loss Consideration | Indoor To Protect Against Both Effects (b) | Outdoor Activity Interference | Outdoor Hearing Loss Consideration | Outdoor To Protect Against Both Effects (b) |
|---|---|---|---|---|---|---|---|
| Residential with Outside Space and Farm Residences | $L_{dn}$ | 45 | | 45 | 55 | | 55 |
| | $L_{eq(24)}$ | | 70 | | | 70 | |
| Residential with No Outside Space | $L_{dn}$ | 45 | | 45 | | | |
| | $L_{eq(24)}$ | | 70 | | | | |
| Commercial | $L_{eq(24)}$ | (a) | 70 | 70(c) | (a) | 70 | 70(c) |
| Inside Transportation | $L_{eq(24)}$ | (a) | 70 | (a) | | | |
| Industrial | $L_{eq(24)}$(d) | (a) | 70 | 70(c) | (a) | 70 | 70(c) |
| Hospitals | $L_{dn}$ | 45 | | 45 | 55 | | 55 |
| | $L_{eq(24)}$ | | 70 | | | 70 | |
| Educational | $L_{eq(24)}$ | 45 | | 45 | 55 | | 55 |
| | $L_{eq(24)}$(d) | | 70 | | | 70 | |
| Recreational Areas | $L_{eq(24)}$ | (a) | 70 | 70(c) | (a) | 70 | 70(c) |
| Farm Land and General Unpopulated Land | $L_{eq(24)}$ | | | | (a) | 70 | 70(c) |

Code:

a. Since different types of activities appear to be associated with different levels, identification of a maximum level for activity interference may be difficult except in those circumstances where speech communication is a critical activity. (See Figure D-2 for noise levels as a function of distance which allow satisfactory communication.)
b. Based on lowest level.
c. Based only on hearing loss.
d. An $L_{eq(8)}$ of 75 dB may be identified in these situations so long as the exposure over the remaining 16 hours per day is low enough to result in a negligible contribution to the 24-hour average, i.e., no greater than an $L_{eq}$ of 60 dB.

Note: Explanation of identified level for hearing loss. The exposure period which results in hearing loss at the identified level is a period of 40 years.

*Refers to energy rather than arithmetic averages.

**Table 3. Exclusion Distances Based on Human Effects for Maximum Sound Pressure Levels (1:117)**

| Source/Health Effect | Target Noise Level (Outside) | Exclusion Distance * (ft) | |
|---|---|---|---|
| Infrasound (15 Hz) | | | |
| Chronic | 95 dB | 4000 | Assuming no building attenuation |
| Acute | 120 dB | 250 | Assuming no building attenuation |
| Noise | | | |
| Hearing Loss | 80 dB(A) | 250 | Open work area |
| | 95 dB(A) | 200 | Inside building (assuming 15 dB Attenuation) |
| Speech Interference | 80 dB(A) (assume 15 dB Attenuation) | 800 | 95% indoor sentence intelligibility |
| | 65 dB(A) | 4000 | 95% sentence intelligibility at 2 meters raised voice |

* Directly behind augmentor tube.

B. Methodology. A microphone with windscreen on a 1.6 meter pole was swept up and down directly over the test point from approximately 0.3 to 3 meters elevation with the microphone axis pointed directly at the hush house. During the approximately 30 second period of the sweep, tape recording was performed and the tapes were later analyzed using a real time analyzer. Spot checks with a hand held sound level meter were accomplished to compare with analyzed results to ensure operational errors had not occurred during data collection. Calibration tapes were made both before and after the survey to verify system performance and produce frequency response curves used to correct the data. Microphone calibration curves were also used to correct the data. Calibration signals, produced by an acoustic calibrator, were recorded before and after each series of readings. A complete list of equipment is shown at Appendix A.

Weather conditions, including temperature, relative humidity, wind speed and direction, and barometric pressure, were monitored at each measurement location by a local weather observer. These data were used to ensure weather conditions did not interfere with measurements and to correct readings to standard conditions as appropriate.

Recordings were made on 28 Jan 89 to determine if the hush houses still met the acceptance criteria. Both hush houses, designated T-10/1 and

T-10/2, were assessed independently at both military and afterburner power levels. T-10/1, installed in March 1986, is configured to test engines installed in the F-15 aircraft. T-10/2, installed in March 1988, is configured to test bare F-100-PW-100 engines in a test stand. Only points 7 through 11 for T-10/1 and 6 through 11 for T-10/2 (see Figure 1) were tested since these included the loudest points for each configuration and were the most likely to create problems at Mr Miller's property (Figure 2). Recordings were made on Mr Miller's property on 28 Jan 89 during the day and night. These tests were performed with T-10/1 and T-10/2 running both individually and together in both military and afterburner power. Readings were also taken at night on his daughter's property, located in another neighborhood (1919 Seward Drive), with T-10/2 in afterburner. Background levels were recorded for each series of tests for comparison to hush house noise levels.

C. Findings:

A discussion with Mr Art Woytek, Hush House Program Office, Kelly AFB, prior to our visit revealed previous hush house problems had been experienced at Langley. At the time of installation of the second hush house (T-10/2) the Corps of Engineers allowed the contractor to install a sand foundation under and around the augmentor tube and deflector instead of the 3/4" aggregate required. This was in spite of the recommendation to the contrary by the Hush House Program Office at Kelly AFB. Appendix B contains the documentation concerning the foundation. The report shows that at initial fire up a cloud of sand was ejected from the deflector. After a foreign object damage (FOD) hazard was ruled out, testing showed the cell did not pass the acoustic criteria. Removal and inspection of the insulation disclosed the sand had packed the insulation, decreasing its ability to attenuate the noise. After insulation replacement, the test cell passed acoustic testing. The presumption appears to have been the sand was no longer present in quantities sufficient to create a problem. Our visual inspection of the test cells on 28 Jan 89 revealed not only had the insulation become packed down in T-10/2, but T-10/1 had the same problem and also appeared not to have the required aggregate foundation. Both hush houses had sand and small gravel deposited inside the augmentor and deflector areas.

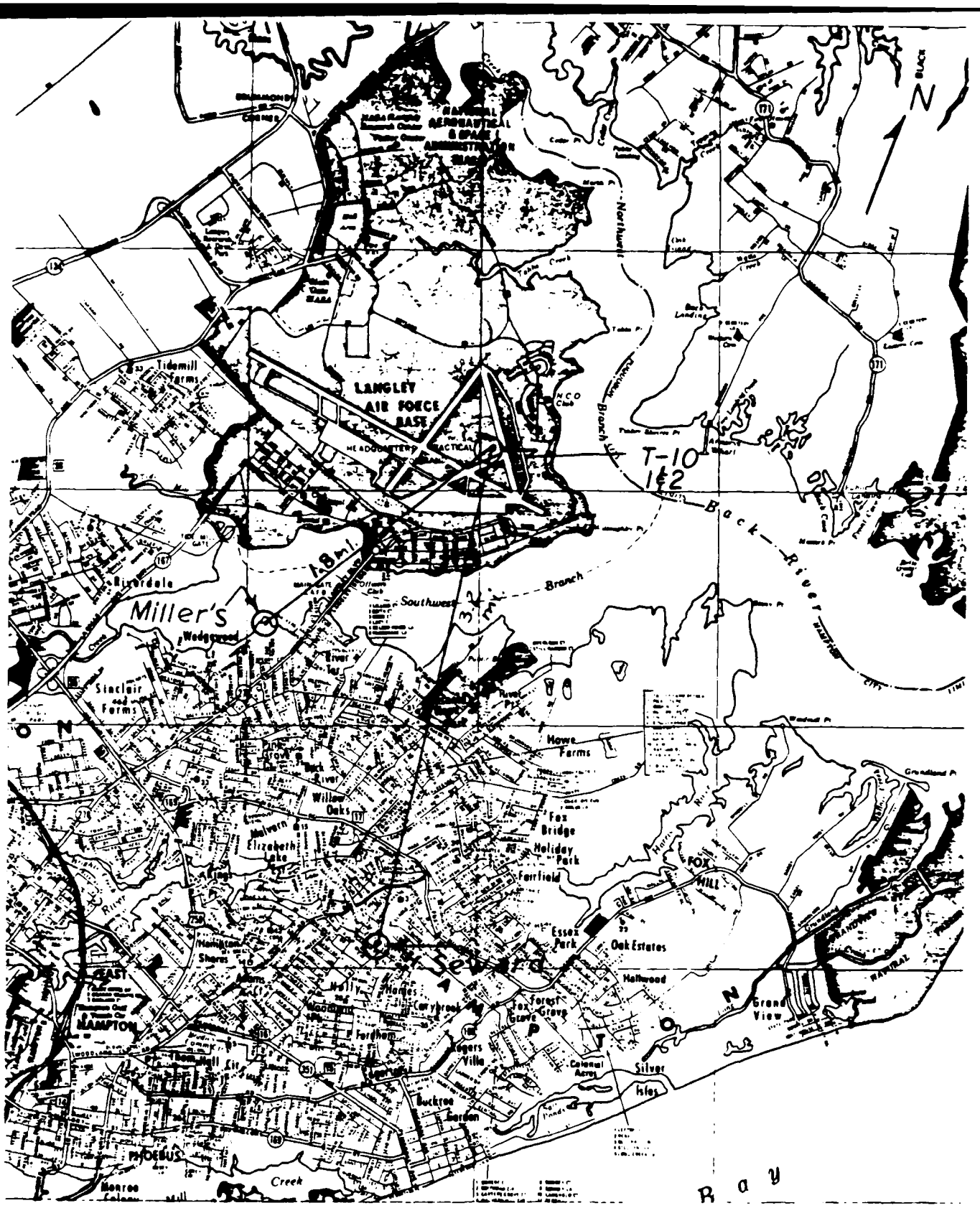



Figure 2. Map of Langley AFB and Local Area.

As summarized in Table 4, acoustic tests performed at 250 feet on both hush houses revealed T-10/1 just met the 80 dB(A) criteria, but T-10/2 did not. One-third octave band sound pressure levels for all points measured are given in tabular and graphic form in Appendix C. Even when properly working, hush houses testing bare engines produce higher noise levels than when testing engines installed in aircraft.

**Table 4. Acceptance Test on T-10 Hush Houses in Afterburner Langley AFB, 28 Jan 89**

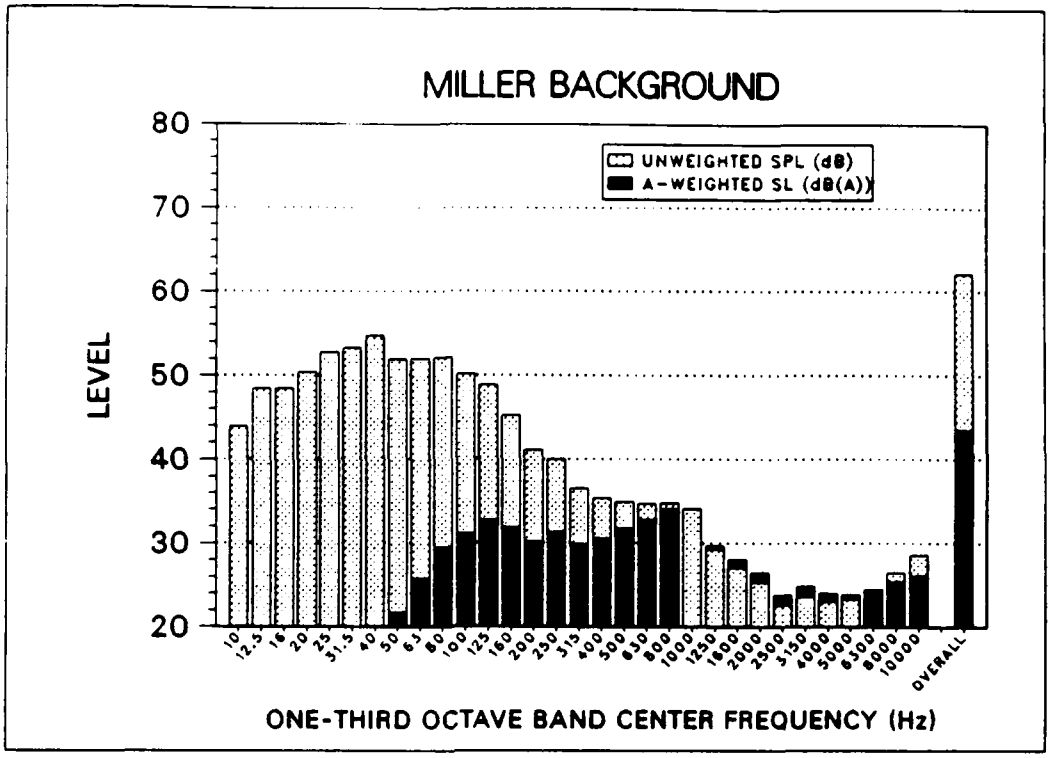
| Hush House | Overall A-Weighted Sound Pressure Level [dB(A)] | | | | | |
|---|---|---|---|---|---|---|
| Position -> | 6 | 7 | 8 | 9 | 10 | 11 |
| T-10/1 (F-15 Aircraft w/F-100 Engines) | * | 78.1 | 77.9 | 79.1 | 78.6 | 78.9 |
| T-10/2 (F-100, Bare Engine) | 79.8 | 79.5 | 79.5 | 80.5 | 81.1 | 81.5 |

* Not measured - in the shadow of T-10/2

Noise tests at Mr Miller's property on the afternoon and evening of 28 Jan 89 showed no appreciable difference between background noise levels and noise produced by aircraft being tested in the hush houses, either by measurement or subjectively. The test results are shown at Table 5 and Figure 3. As the tests at Mr Miller's property were coming to a close at 2230, his daughter called him to say she was experiencing effects similar to those he had described to her. She named the exact times the hush houses had been running in afterburner. Measurements taken on her property at 1919 Seward Drive (see Table 6 and Figure 4) later in the evening confirmed the presence of increased low frequency energy during operation of T-10/2 in afterburner. The effect was also evident subjectively through both vibration sensations and audible house vibrations. Complaints from others in the same area during this period confirmed the existence of a problem.

D. Observations:

The degradation of the ability of the T-10 to attenuate noise resulting from the improper foundation material allowing sand and small rocks to be drawn in by the jet engine intake and exhaust will continue unless measures are taken to correct the problem. Both hush houses suffer from this problem. The effect is worse in T-10/2, since it is used to test bare engines which produce more noise than installed engines. Inspection of both hush houses revealed gravel and sand had accumulated where the augmentor meets the deflector section. About 50 percent of the insulation had been moved away from the screen, seriously degrading the attenuation.



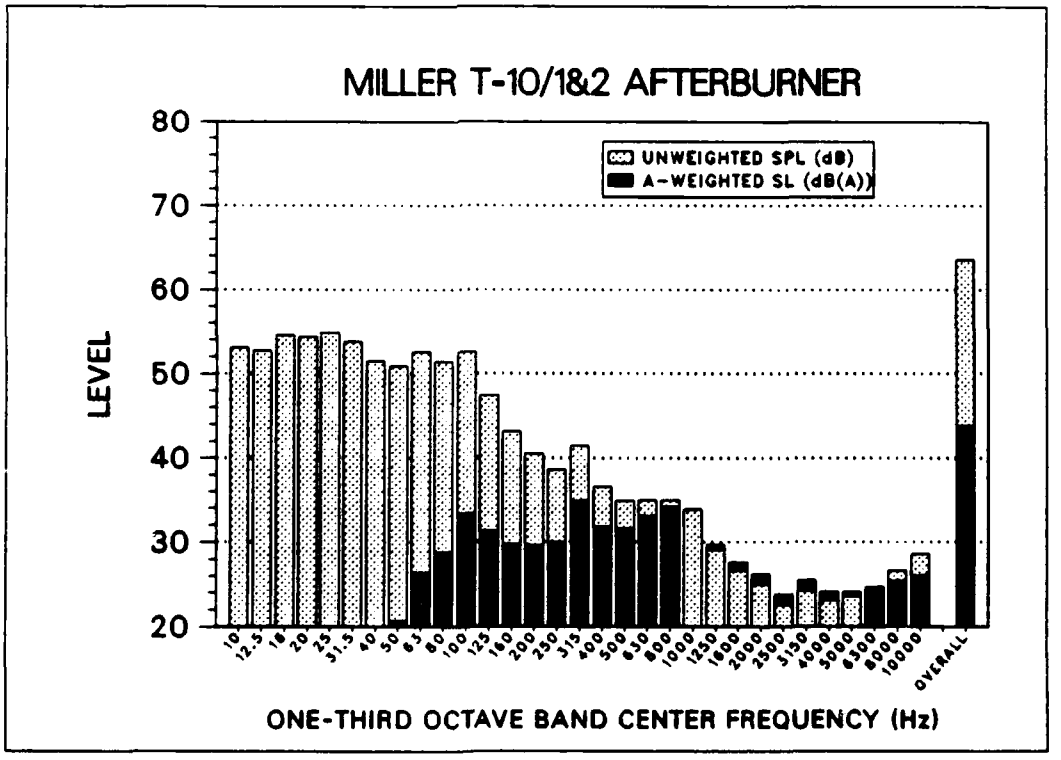
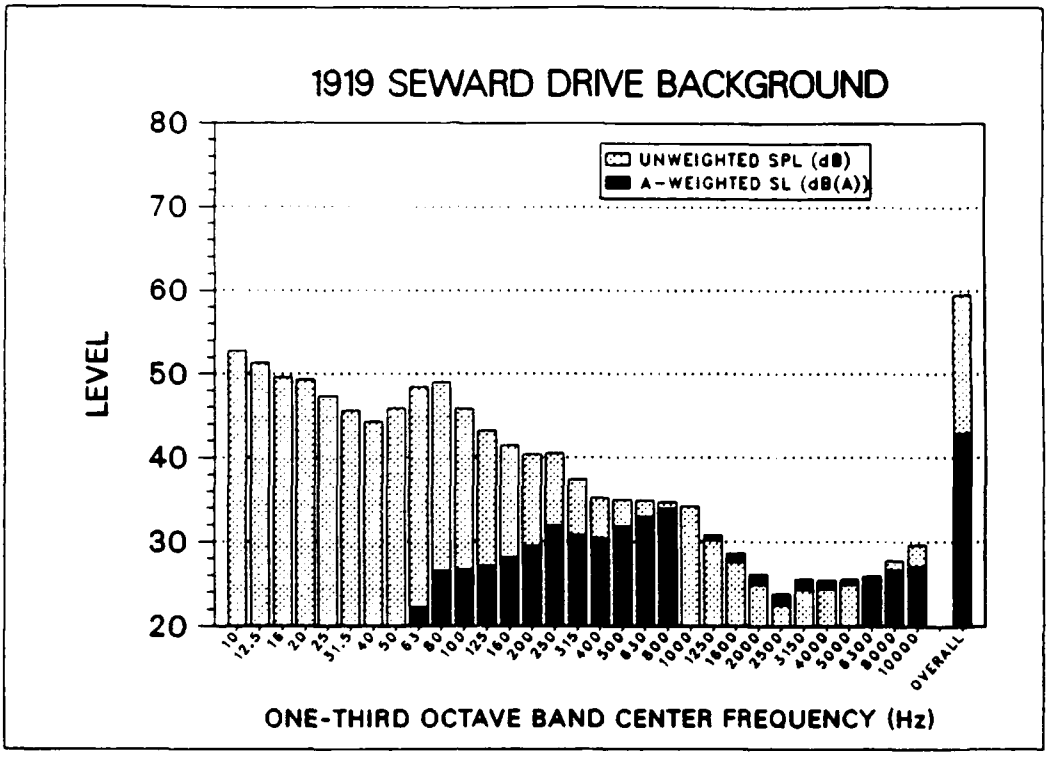




**Figure 3. Measurements at the Millers' Property with Both T-10/1 & 2 in Afterburner, 2200 Hrs, 28 Jan 1989**

**Table 5. Measurements at the Millers' Property with Both T-10/1 & 2 in Afterburner, 2200 Hrs, 28 Jan 89**

| One Third Octave Band Frequency (Hz) | Background Sound Pressure Level (dB) | T-10/1 & 2 AB Sound Pressure Level (dB) | T-10/1 & 2 AB Minus Background (dB) |
|---|---|---|---|
| 10 | 43.9 | 53.1 | 9.2 |
| 12.5 | 48.4 | 52.7 | 4.3 |
| 16 | 48.4 | 54.6 | 6.2 |
| 20 | 50.4 | 54.6 | 4.2 |
| 25 | 52.8 | 54.9 | 2.1 |
| 31.5 | 53.3 | 53.8 | 0.5 |
| 40 | 54.7 | 51.5 | - 3.2 |
| 50 | 51.9 | 50.9 | - 1.0 |
| 63 | 52.0 | 52.6 | 0.6 |
| 80 | 52.1 | 51.4 | - 0.7 |
| 100 | 50.2 | 52.6 | 2.4 |
| 125 | 48.8 | 47.4 | - 1.6 |
| 160 | 45.2 | 43.1 | - 2.1 |
| 200 | 41.1 | 40.5 | - 0.6 |
| 250 | 40.0 | 38.6 | - 1.4 |
| 315 | 36.5 | 41.5 | 5.0 |
| 400 | 35.3 | 36.6 | 1.3 |
| 500 | 34.9 | 34.9 | 0.0 |
| 630 | 34.7 | 35.0 | 0.3 |
| 800 | 34.8 | 35.0 | 0.2 |
| 1,000 | 34.1 | 33.9 | - 0.2 |
| 1,250 | 29.2 | 29.1 | - 0.1 |
| 1,600 | 27.1 | 26.6 | - 0.5 |
| 2,000 | 25.3 | 25.0 | - 0.3 |
| 2,500 | 22.6 | 22.6 | 0.0 |
| 3,150 | 23.6 | 24.3 | 0.7 |
| 4,000 | 23.0 | 23.1 | 0.1 |
| 5,000 | 23.3 | 23.6 | 0.3 |
| 6,300 | 24.5 | 24.7 | 0.2 |
| 8,000 | 26.5 | 26.6 | 0.1 |
| 10,000 | 28.6 | 28.6 | 0.0 |
| Overall A-weighted | 43.5 | 43.8 | 0.3 |



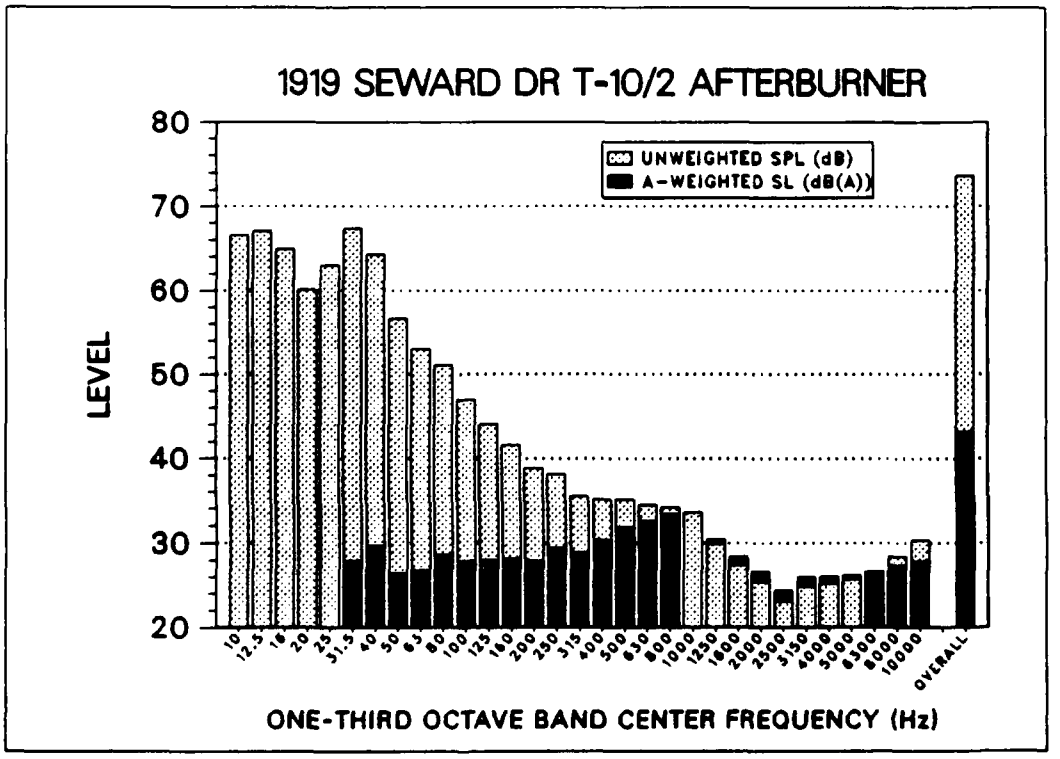




**Figure 4. Measurements at 1919 Seward Drive with T-10/2 in Afterburner, 2300 Hrs, 28 Jan 1989**

**Table 6. Measurements at 1919 Seward Drive with T-10/2 in Afterburner, 2300 Hrs, 28 Jan 89**

| One-Third Octave Band Frequency (Hz) | Background Sound Pressure Level (dB) | T-10/2 AB Sound Pressure Level (dB) | T-10/2 AB Minus Background (dB) |
|---|---|---|---|
| 10 | 52.8 | 66.6 | 13.8 |
| 12.5 | 51.3 | 67.1 | 15.8 |
| 16 | 49.6 | 64.9 | 15.3 |
| 20 | 49.3 | 60.1 | 10.8 |
| 25 | 47.3 | 63.0 | 15.7 |
| 31.5 | 45.6 | 67.4 | 21.8 |
| 40 | 44.3 | 64.3 | 20.0 |
| 50 | 45.9 | 56.6 | 10.7 |
| 63 | 48.4 | 53.0 | 4.6 |
| 80 | 49.0 | 51.1 | 2.1 |
| 100 | 45.8 | 47.0 | 1.2 |
| 125 | 43.2 | 44.1 | 0.9 |
| 160 | 41.4 | 41.6 | 0.2 |
| 200 | 40.3 | 38.8 | - 1.5 |
| 250 | 40.5 | 38.1 | - 2.4 |
| 315 | 37.4 | 35.5 | - 1.9 |
| 400 | 35.2 | 35.1 | - 0.1 |
| 500 | 35.0 | 35.1 | 0.1 |
| 630 | 34.9 | 34.5 | - 0.4 |
| 800 | 34.7 | 34.2 | - 0.5 |
| 1,000 | 34.2 | 33.6 | - 0.6 |
| 1,250 | 30.2 | 29.9 | - 0.3 |
| 1,600 | 27.6 | 27.4 | - 0.2 |
| 2,000 | 24.9 | 25.4 | 0.5 |
| 2,500 | 22.5 | 23.1 | 0.6 |
| 3,150 | 24.3 | 24.8 | 0.5 |
| 4,000 | 24.4 | 25.3 | 0.9 |
| 5,000 | 24.9 | 25.7 | 0.8 |
| 6,300 | 25.9 | 26.6 | 0.7 |
| 8,000 | 27.7 | 28.4 | 0.7 |
| 10,000 | 29.6 | 30.3 | 0.7 |
| Overall A-weighted | 42.9 | 43.2 | 0.3 |

AB - Afterburner

Data collected the night of 28 Jan 89 at the Miller property is represented graphically in Figure 3. The background level is 42.9 dB(A). With both hush houses running in afterburner the level is 43.8 dB(A), an insignificant difference, especially since these readings were collected at different times. The low frequency data, below about 50 Hz, show very little difference, with all frequencies indicating readings in the low 50 dB range. No audible difference existed and no rattling of the house occurred. Figure 4 shows direct evidence of the problem collected at 1919 Seward Drive after Mr Miller's daughter called. The background level of 42.9 dB(A) versus the level of 43.2 dB(A) with T-10/2 in afterburner is again not meaningful. However, at 50 Hz and below the change is dramatic. Differences of 14 to 22 dB (equal to levels 25 to 158 times higher) make apparent the effect the wind has on shifting this effect. The wind was 11 degrees at less than 5 knots. This location is at 191 degrees relative to the hush houses. Therefore, it was directly downwind from the hush houses. Thus, the wind directs the noise, particularly at low frequencies, causing an intermittent problem at any one particular location.

The A-weighted sound pressure level caused by hush house operations does not exceed background levels by any significant amount. The measured afterburner noise level of less than 45 dB(A) would not contribute to the Ldn enough to cause the EPA recommended Ldn level of 55 dB(A) to be exceeded. Thus, technically there is no audible community noise problem created by operation of the hush houses even in their presently degraded condition. The exclusion distance levels for human effects are also not exceeded.

## III. CONCLUSIONS

A. Both T-10 Hush Houses are out of specification and must be repaired. The first T-10 would probably not pass if a bare engine was installed. The visual evidence of packed insulation accompanied by the presence of sand and small gravel in T-10/1 and 2 indicates the same problem with both hush houses. The performance of both will continue to degrade, creating more widespread problems and complaints.

B. The low frequency energy, increased because of the degradation of the hush houses (primarily T-10/2 at present), is being channeled by the wind to create problems downwind of the hush houses. The problem is intermittent since only at certain times is a particular populated area downwind of the hush houses. The Environmental Protection Agency recommendation of an Ldn of 55 dB(A) is not exceeded by hush house operation.

C. The complaints by Mr Miller of the rattling of windows and other objects were validated during a visit by the base bioenvironmental engineering and public affairs offices. Recordings taken during this AFOEHL survey at Mr Miller's daughter's house objectively confirm the presence of low frequency noise concurrent with hush house operations. We do not believe it is likely the cracks in Mr Miller's house were caused by hush house operations. However, we are not structural damage experts.

## IV. RECOMMENDATIONS

A. Long Term

1. Repair the hush houses by submitting an emergency request to SA-ALC as outlined in T.O. 00-25-107. The foundation problem must be resolved to ensure the situation does not recur.

2. Perform acoustic testing after the repairs to ensure the criterion is met and low frequencies have been reduced.

B. Short Term

1. Restrict the operation of the hush houses to times when the wind is not blowing in the direction of highly populated areas. Winds up to about 5 to 7 knots may be tolerable, but if complaints occur this constraint may have to be made more restrictive.

2. Continue to maintain the log of complaints already started. Correlate this log with wind speed and direction to relax or tighten the weather restriction as appropriate.

3. Inform the community, and particularly Mr Miller, of the results of the survey and its conclusions. Explain the problem is the result of malfunctioning equipment which will take some time to repair. The weather restriction will allow the base to accomplish its mission while minimizing, but possibly not eliminating, the adverse impact on the community. The base should explain the plan and work with the community (and especially the Millers) to modify weather restrictions to this end.

## REFERENCES


1. "Preliminary Final of Hush House Site Planning Bulletin", HQ AFLC/DEPR Ltr, 4 Aug 1987.

2. Information on Levels of Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety, EPA Report 550/9-74-004, Environmental Protection Agency (March, 1974)

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# APPENDIX A

## Measurement System Equipment List

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RECORDING SYSTEM EQUIPMENT

| Equipment | Manufacturer | Model/Type | Serial Number |
|---|---|---|---|
| Tape Recorder | Bruel & Kjaer | 7006 | 130751 |
| Microphone Power Supply | Bruel & Kjaer | 2804 | 1338144 |
| Microphone Preamplifier | Bruel & Kjaer | 2639 | 1334751 |
| Microphone | Larson Davis | 2541 | 1070 |
| Frequency Modulation Units (4 each) | Bruel & Kjaer | ZM0053 | N/A |

CALIBRATION EQUIPMENT

| Equipment | Manufacturer | Model/Type | Serial Number |
|---|---|---|---|
| Acoustic Calibrator | Larson Davis | CA 250 | 0338 |
| Synthesizer/Function Generator | Hewlett Packard | 3325A | 2512A22219 |
| Distortion Analyzer | Hewlett Packard | 334A | 1140A11082 |

DATA ANALYSIS EQUIPMENT

| Equipment | Manufacturer | Model/Type | Serial Number |
|---|---|---|---|
| Real Time Analyzer | Norwegian Electronics | 830 | 11530 |

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# APPENDIX B

## T-10/2 Installation Documentation

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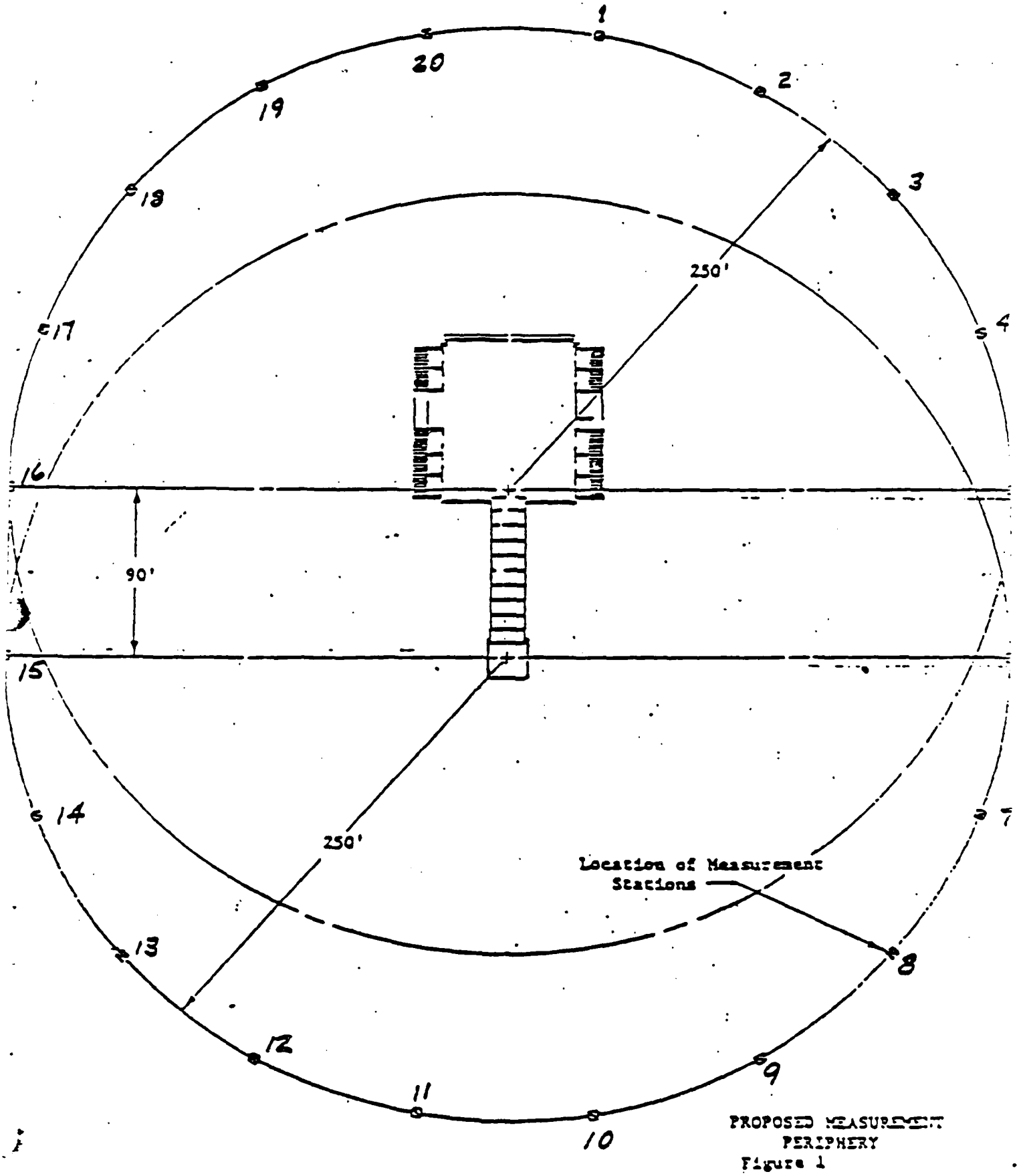


PROPOSED MEASUREMENT PERIPHERY

Figure 1

# TEST REPORT

## ACOUSTICAL EVALUATION

Test conducted before replacement of deflector

Contract No. F41608-82-C-1960

Date 3-24-88 Location Langley AFB

Noise Suppressor Model A/F37T-10 Serial No. F100-PW100 #P681071

Test Conducted By Richard Herbin Industrial Acoustics Company

Test Witnessed Dahlen Gardner USAF Representative/Office

### ACOUSTICAL MEASUREMENT EQUIPMENT

| DESCRIPTION | MANUFACTURER | TYPE | SERIAL NO. |
|---|---|---|---|
| Sound Level Meter | | | |
| Octave Band Analyzer | | | |
| Acoustical Calibrator | | | |
| Microhpones (for use with 50' cable) | | | |

### OPERATING CONDITIONS

Aircraft/Engine _____

Serial No. _____

☐ R.H. Eng. @ _____ Pwr.

☐ L.H. Eng. @ _____ Pwr.

☐ SGL. Eng. @ _____ Pwr.

☐ Bare Eng. @ MIL / AB Pwr.

Cell Depression 1.8 / 2.0 in $H_2O$

### METEOROLOGICAL DATA

Ambient Temperature ____ ° F _____

Barometric Pressure ____ in. HG.

Relative Humidity ____ %

Surface Wind Velocity MPH 10-15, gusts 22

Surface Wind Direction Az W/SW

Precipitation _____ Fog _____

Time of Day _____

### MEASUREMENTS

| POSITION & DISTANCE | SOUND LEVEL MIL dBA | AB |
|---|---|---|
| 1 250' | 76 | 82 |
| 2 | 80 ⇄ | 76 |
| 3 | 74 | 80 |
| 4 | 71 | 77 |
| 5 | 70 | 76 |
| 6 | 72 | 80 |
| 7 | 72 | 82 |
| 8 | 74 | 82 |
| 9 | 74 | 83 |
| 10 | 73 | 82 |
| 11 | 73 | 82 |
| 12 | 73 | 82 |
| 13 | 74 | 81 |
| 14 | 75 | 82 |
| 15 | | |
| 16 | | |
| 17 | | |
| 18 | 76 | 78 |
| 19 | 74 | 77 |
| 20 250' | 77 | 81 |
| CONTROL ROOM | 63 | 69 |

# TEST REPORT

## ACOUSTICAL EVALUATION

Test conducted before replacement of deflector

Contract No. F41608-82-C-1960

Date Fri 3-24-88 Location Langley

Noise Suppressor Model A/F37T-10 Serial No. F16C #2018

Test Conducted By R Herbin Industrial Acoustics Company

Test Witnessed D Gardner USAF Representative/Office

ACOUSTICAL MEASUREMENT EQUIPMENT

| DESCRIPTION | MANUFACTURER | TYPE | SERIAL NO. |
|---|---|---|---|
| Sound Level Meter | | | |
| Octave Band Analyzer | | | |
| Acoustical Calibrator | | | |
| Microhpones (for use with 50' cable) | | | |

### OPERATING CONDITIONS

Aircraft/Engine _____

Serial No. _____

☐ R.H. Eng. @ _____ Pwr.

☐ L.H. Eng. @ _____ Pwr.

☐ SGL. Eng. @ _____ Pwr.

☐ Bare Eng. @ _____ Pwr.

Cell Depression 1.6 / 1.8 in $H_2O$
MIL / AB

### METEOROLOGICAL DATA

Ambient Temperature ____ ° F _____

Barometric Pressure ____ in. HG.

Relative Humidity ____ %

Surface Wind Velocity MPH 25-28 knots

Surface Wind Direction Az 25- W/SW

Precipitation _____ Fog _____

Time of Day _____

### MEASUREMENTS

| POSITION & DISTANCE | SOUND LEVEL MIL dBA | AB |
|---|---|---|
| 1 250' | 73 | 80 |
| 2 | 70 | 78 |
| 3 | 70 | 78 |
| 4 | 68 | 75 |
| 5 | 65 | 73 |
| 6 | 70 | 80 |
| 7 | 72 | 80 |
| 8 | 70 | 80 |
| 9 | 68 | 78 |
| 10 | 69 | 70 |
| 11 | 72 | 79 |
| 12 | 73 | 81 |
| 13 | 74 | 81 |
| 14 | 74 | 82 |
| 15 | | |
| 16 | | |
| 17 | | |
| 18 | 71 | 77 |
| 19 | 68 | 76 |
| 20 250' | 72 | 80 |
| CONTROL ROOM | 64 | |

# TEST REPORT

## ACOUSTICAL EVALUATION

Contract No. F41608-86-C-1400

Date 29 March 1988 Location Langley AFB

Noise Suppressor Model A/F37T-10 Serial No. _____

Test Conducted By R Herbin Industrial Acoustics Company

Test Witnessed D Gardner USAF Representative/Office

### ACOUSTICAL MEASUREMENT EQUIPMENT

| DESCRIPTION | MANUFACTURER | TYPE | SERIAL NO. |
|---|---|---|---|
| Sound Level Meter } | B&K 2215 | | |
| Octave Band Analyzer } | and SA-ALC Digital readout B&K meter | | |
| Acoustical Calibrator | | | |
| Microhpones (for use with 50' cable) | | | |

### OPERATING CONDITIONS

Aircraft/Engine F-15C

Serial No. 3025

☐ R.H. Eng. @ _____ Pwr.

☐ L.H. Eng. @ _____ Pwr.

☐ SGL. Eng. @ _____ Pwr.

☐ Bare Eng. @ _____ Pwr.

Cell Depression _____ in $H_2O$

### METEOROLOGICAL DATA

Ambient Temperature 70 ° F

Barometric Pressure ____ in. HG.

Relative Humidity ____ %

Surface Wind Velocity MPH 5-8

Surface Wind Direction Az Southeast

Precipitation clear Fog _____

Time of Day _____

Data transcribed by R Herbin on 4-27-88

### MEASUREMENTS

| POSITION & DISTANCE | SOUND LEVEL MIL dBA | AB |
|---|---|---|
| 1 250' | 74 | 79.5 |
| 2 | 71 | 77.5 |
| 3 | 71 | 78 |
| 4 | 69 | 76 |
| 5 | 66 | 75 |
| 6 | 74.5 | 83 |
| 7 | 75 | 83 |
| 8 | 74.5 | 82 |
| 9 | 75.5 | 82.5 |
| 10 | 75 | 81 |
| 11 | 75.5 | 82 |
| 12 | 76 | 84 |
| 13 | 74 | 83 |
| 14 | | |
| 15 | | |
| 16 | | |
| 17 | | |
| 18 | 71 | 77 |
| 19 | 70 | 76 |
| 20 250' | 72.5 | 79 |
| CONTROL ROOM | 65 | 72 |

(5)

j. Compare recorded data with prototype data on Figure VII.

k. Should deficiencies exist, obtain close-in data to determine cause and corrective action required.

5. CERTIFICATION

The Noise Suppressor System meets the requirements of the documents listed under Paragraph B above and as defined herein except as noted.

Industrial Acoustics Company Representative — Richard Herbin

USAF Representative/Office — Dahlen Gardner 3/30/88

D. COMMENTS (Reference by paragraph no.)

NOISE LEVELS ARE NOT ACCEPTABLE AT REAR OF BUILDING (POINTS 6-15). LEVELS RANGE FROM 81 DB(A) TO 84 DB(A) BY TAKING OCTAVE BAND READINGS, IT WAS DETERMINED THAT MOST OF THE NOISE WAS COMING FROM THE LOWER FREQUANCY BANDS (NOISE FROM DEFLECTOR AREA). AFTER CLOSELY INSPECTING THE DEFLECTOR AREA, IT WAS DETERMINED THAT THE ACCOUSTICAL PANELS WERE NOT INSULATED PROPERLY (½ OF THE INSULATION IS MISSING FROM INSIDE ALL PANELS IN THE DEFLECTOR AREA. PANELS WILL HAVE TO BE REMOVED AND REPLACED WITH PROPERLY INSULATED PANELS.

Above per Dahlen Gardner, 3/29/88

Refer to Test Data of 4/20/88 and explanation which follows in Section VI, Page VI-4.

Richard Herbin 4/27/88

## VI EXPLANATION OF ACOUSTICAL DATA AND CONDITION OF DEFLECTOR PANELS

During construction of subject Noise Suppressor, IAC noted that the sand fill which had been noted in the IAC foundation inspection report was still present under the augmentor tube and blast deflector. (The correct fill for these areas is coarse stone aggregate.) When the first engine run was attempted during acceptance testing of the completed Hush House, it became apparent that large quantities of this sand were being blown out of the exhaust from the area under the deflector. Since the prevailing winds were depositing this sand around the air intakes and front main doors, testing was halted to allow base personnel to verify that no F.O.D. hazard existed. Acoustical readings subsequently taken during engine and aircraft runs on 23 and 24 March exceeded specification by 2-3 dBA; therefore, it was decided to repeat the tests during the week of 27 March, when the effects of the 20-30 knot winds which had been present during the original tests would be eliminated.

Acoustical readings obtained on 29 March showed higher noise levels than those originally measured, and the augmentor and deflector were inspected for possible causes. The deflector ramp and sidewall panels were then observed to have empty void space in approximately the top 50% of the volume which is normally packed with Basalt Wool insulation.

The IAC South Carolina manufacturing plant was immediately requested to inspect in-process and completed deflector panels to detect similar cases. All panels checked were found to be properly filled. Arrangements were made to ship panels to Langley to replace the apparently defective panels.

Installation of the replacement panels was completed on 20 April. An engine run conducted on that date resulted in satisfactory acoustical readings. At the same time, the defective panels were returned to the factory for inspection.

Inspection of the returned panels indicated that, while they did indeed contain the correct quantity of Basalt Wool insulation, it had been compressed and forced to the bottom by large amounts of sand which had entered, and remained inside, the panels. Therefore, the apparent insulation defects were actually a consequence of an abnormally abusive sand storm environment in the deflector. The causes, as previously noted, were not under the control of IAC, and had been reported by IAC as requiring correction.

Most of the loose sand seems to have been blown out of the deflector, but further undesirable consequences of this condition cannot be ruled out until the proper coarse aggregate is installed.

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS SAN ANTONIO AIR LOGISTICS CENTER (AFLC)
KELLY AIR FORCE BASE, TEXAS 78241-5000

REPLY TO ATTN OF: PMZSB

NOV 0 3 1987

SUBJECT: T-10 #2 Foundation at Langley AFB, VA

TO: Army Corps of Engineers
Attn: Mr. Grady Wesson
Drawer K
Langley AFB
Hampton, VA 23665

1. Industrial Acoustics Co., Inc. surveyed the above subject foundation on 8 Oct 1987. Items which your foundation contractor must correct are:

(a) Augmentor area trench must have soil removed and brought to correct elevation with large coarse aggregate (greater than 3/4" in size). The deflector area abutting the end of the augmentor must have soil fill removed and replaced with large coarse aggregate also.

(b) Length of each rail trench in the main front sliding door area must be extended 2" beyond the last set of trench anchor bolts outward of gridlines 4A & 1A.

2. Anchor plates J, L, N & P for the ramp assembly will not require modification location-wise.

3. If you have any questions please call Mr. Arthur Woytek at autovon 945-4281 or Mr. Arturo Gaytan at commercial 512/922-2545.

Thomas Tamez
Contracting Officer

cc: SA-ALC/MMIEM/A. Woytek/J. Garner
SSAI/R. Diggs/A. Gaytan/D. Gardner

# TEST REPORT

## ACOUSTICAL EVALUATION

TEST DATA AFTER REPLACEMENT OF DEFLECTOR

Contract No. F41608-82-C-1960

Date 20 April 88 Location Langley

Noise Suppressor Model A/F37T-10 Serial No. 219

Test Conducted By C J Sessions Industrial Acoustics Company

Test Witnessed 2Lt O'Toole / MSgt O'Toole USAF Representative/Office

### ACOUSTICAL MEASUREMENT EQUIPMENT

| DESCRIPTION | MANUFACTURER | TYPE | SERIAL NO. |
|---|---|---|---|
| Sound Level Meter | Gen Rad | 1982 | A5GP13/HHB0374 |
| Octave Band Analyzer | Gen Rad | 1982 | A5GP13/HHB0374 |
| Acoustical Calibrator | | | |
| Microhpones (for use with 50' cable) | N/A | N/A | N/A |

### OPERATING CONDITIONS

Aircraft/Engine F100

Serial No. P68 2050

☐ R.H. Eng. @ _____ Pwr.

☐ L.H. Eng. @ _____ Pwr.

☐ SGL. Eng. @ _____ Pwr.

☑ Bare Eng. @ MIL/AB Pwr.

Cell Depression _____ in $H_2O$

### METEOROLOGICAL DATA

Ambient Temperature ____ ° F _____

Barometric Pressure ____ in. HG.

Relative Humidity ____ %

Surface Wind Velocity MPH _____

Surface Wind Direction Az _____

Precipitation _____ Fog _____

Time of Day _____

### MEASUREMENTS

| POSITION & DISTANCE | SOUND LEVEL dBA | |
|---|---|---|
| 1 250' | 112 | 113 |
| 2 | | |
| 3 | | |
| 4 | | |
| 5 | 71 | 77 |
| 6 | 71 | 76 |
| 7 | 72 | 78 |
| 8 | 72 | 79 |
| 9 | 72 | 80 |
| 10 | 70 | 75 |
| 11 | 70 | 79 |
| 12 | 71 | 79 |
| 13 | | |
| 14 | | |
| 15 | | |
| 16 | | |
| 17 | | |
| 18 | | |
| 19 | | |
| 20 250' | | |
| CONTROL ROOM | | |

(4)

# APPENDIX C

## One-Third Octave Band Data

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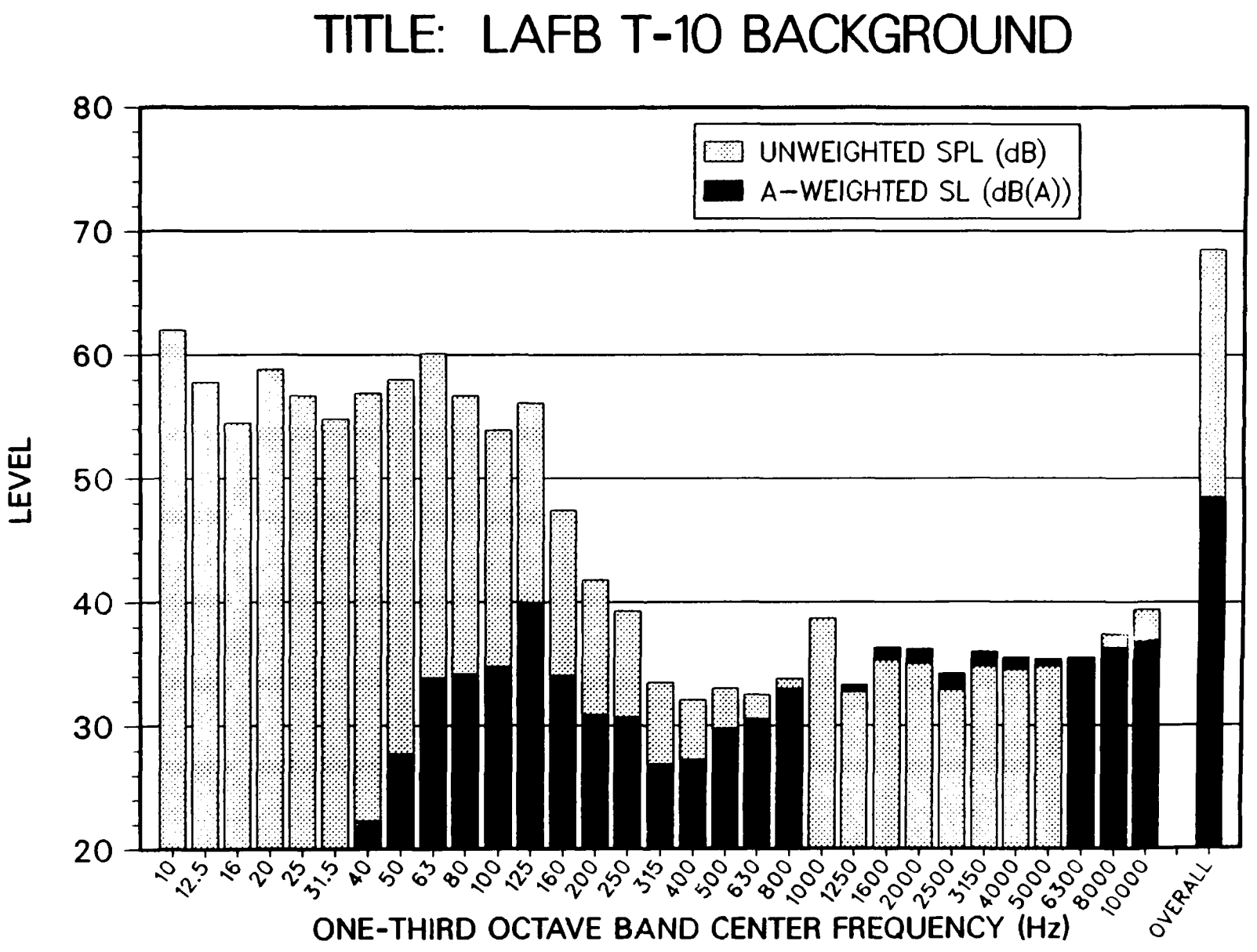
# TITLE: LAFB T-10 BACKGROUND

| FREQ (Hz) | SOUND PRESSURE LEVEL (dB) | OCTAVE BAND SPL (dB) | A-WEIGHTED SOUND LEVEL [dB(A)] | A-WEIGHTED OCTAVE BAND SL [dB(A)] |
|---|---|---|---|---|
| 10 | 62 | | 0 | |
| 12.5 | 57.8 | | 0 | |
| 16 | 54.5 | 62 | 0 | 8.7 |
| 20 | 58.8 | | 8.4 | |
| 25 | 56.7 | | 12 | |
| 31.5 | 54.8 | 60.8 | 15.4 | 23.2 |
| 40 | 56.9 | | 22.3 | |
| 50 | 58 | | 27.7 | |
| 63 | 60.1 | 63.1 | 33.9 | 37.4 |
| 80 | 56.7 | | 34.2 | |
| 100 | 53.9 | | 34.8 | |
| 125 | 56.1 | 58.3 | 40 | 41.8 |
| 160 | 47.4 | | 34.1 | |
| 200 | 41.8 | | 30.9 | |
| 250 | 39.3 | 43.9 | 30.7 | 34.4 |
| 315 | 33.5 | | 26.9 | |
| 400 | 32.1 | | 27.3 | |
| 500 | 33 | 37.1 | 29.8 | 34 |
| 630 | 32.5 | | 30.6 | |
| 800 | 33.8 | | 33 | |
| 1,000 | 38.7 | 40.5 | 38.7 | 40.5 |
| 1,250 | 32.7 | | 33.3 | |
| 1,600 | 35.3 | | 36.3 | |
| 2,000 | 35 | 39.1 | 36.2 | 40.2 |
| 2,500 | 32.9 | | 34.2 | |
| 3,150 | 34.8 | | 36 | |
| 4,000 | 34.5 | 39.3 | 35.5 | 40.2 |
| 5,000 | 34.8 | | 35.4 | |
| 6,300 | 35.5 | | 35.4 | |
| 8,000 | 37.4 | 42.3 | 36.3 | 40.8 |
| 10,000 | 39.4 | | 36.9 | |

***** OVERALL LEVELS (10 - 10000 Hz) *****

**OASPL = 68.5 dB  OASLA = 48.5 dB(A)**

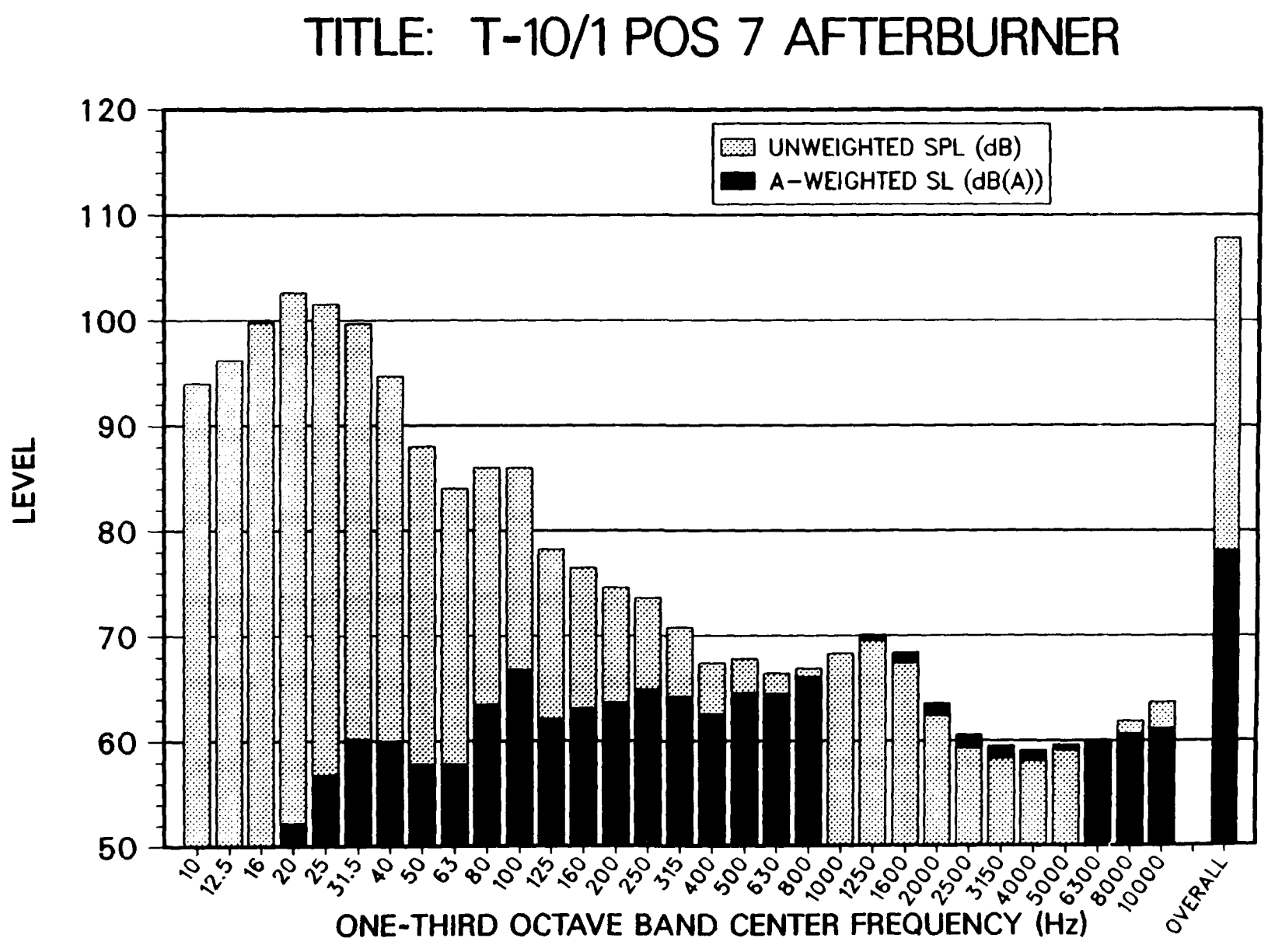

TITLE: LAFB T-10 BACKGROUND
UNWEIGHTED SPL (dB)
A-WEIGHTED SL (dB(A))
LEVEL
80
70
60
50
40
30
20
10
12.5
16
20
25
31.5
40
50
63
80
100
125
160
200
250
315
400
500
630
800
1000
1250
1600
2000
2500
3150
4000
5000
6300
8000
10000
OVERALL
ONE-THIRD OCTAVE BAND CENTER FREQUENCY (Hz)

# TITLE: T-10/1 POS 7 AFTERBURNER

| FREQ (Hz) | SOUND PRESSURE LEVEL (dB) | OCTAVE BAND SPL (dB) | A-WEIGHTED SOUND LEVEL [dB(A)] | A-WEIGHTED OCTAVE BAND SL [dB(A)] |
|---|---|---|---|---|
| 10 | 94 | | 23.5 | |
| 12.5 | 96.2 | | 32.8 | |
| 16 | 99.8 | 104.9 | 43.1 | 52.5 |
| 20 | 102.6 | | 52.2 | |
| 25 | 101.5 | | 56.8 | |
| 31.5 | 99.7 | 104 | 60.2 | 63.9 |
| 40 | 94.7 | | 60 | |
| 50 | 88 | | 57.8 | |
| 63 | 84 | 90.9 | 57.8 | 65.2 |
| 80 | 86 | | 63.5 | |
| 100 | 86 | | 66.8 | |
| 125 | 78.2 | 86.8 | 62.1 | 69.1 |
| 160 | 76.5 | | 63.1 | |
| 200 | 74.6 | | 63.7 | |
| 250 | 73.6 | 77.8 | 64.9 | 68.9 |
| 315 | 70.8 | | 64.2 | |
| 400 | 67.4 | | 62.6 | |
| 500 | 67.8 | 71.8 | 64.6 | 68.6 |
| 630 | 66.4 | | 64.5 | |
| 800 | 66.9 | | 66.1 | |
| 1,000 | 68.3 | 73 | 68.3 | 73 |
| 1,250 | 69.5 | | 70.1 | |
| 1,600 | 67.4 | | 68.4 | |
| 2,000 | 62.4 | 68.9 | 63.6 | 70 |
| 2,500 | 59.3 | | 60.6 | |
| 3,150 | 58.3 | | 59.5 | |
| 4,000 | 58.1 | 63.1 | 59.1 | 64 |
| 5,000 | 59.1 | | 59.6 | |
| 6,300 | 60.1 | | 60 | |
| 8,000 | 61.9 | 66.7 | 60.7 | 65.3 |
| 10,000 | 63.7 | | 61.2 | |

*** OVERALL LEVELS (10 - 10000 Hz) ***

OASPL = 107.8 dB  OASLA = 78.1 dB(A)

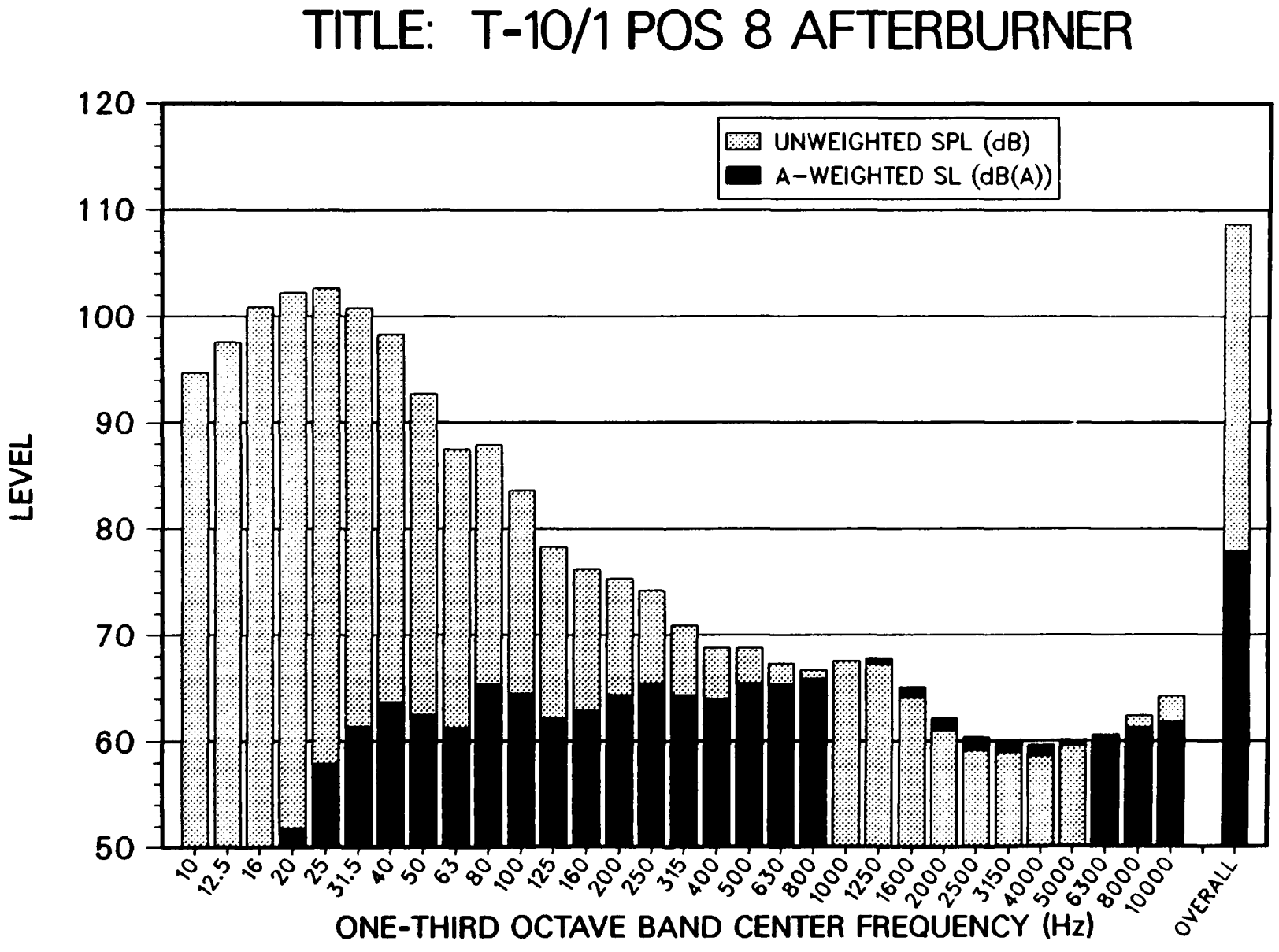

TITLE: T-10/1 POS 7 AFTERBURNER
UNWEIGHTED SPL (dB)
A-WEIGHTED SL (dB(A))
LEVEL
120
110
100
90
80
70
60
50
10
12.5
16
20
25
31.5
40
50
63
80
100
125
160
200
250
315
400
500
630
800
1000
1250
1600
2000
2500
3150
4000
5000
6300
8000
10000
OVERALL
ONE-THIRD OCTAVE BAND CENTER FREQUENCY (Hz)

# TITLE: T-10/1 POS 8 AFTERBURNER

| FREQ (Hz) | SOUND PRESSURE LEVEL (dB) | OCTAVE BAND SPL (dB) | A-WEIGHTED SOUND LEVEL [dB(A)] | A-WEIGHTED OCTAVE BAND SL [dB(A)] |
|---|---|---|---|---|
| 10 | 94.7 | | 24.2 | |
| 12.5 | 97.6 | | 34.2 | |
| 16 | 100.9 | 105.2 | 44.2 | 52.3 |
| 20 | 102.2 | | 51.8 | |
| 25 | 102.6 | | 57.9 | |
| 31.5 | 100.8 | 105.5 | 61.4 | 66.2 |
| 40 | 98.3 | | 63.7 | |
| 50 | 92.7 | | 62.5 | |
| 63 | 87.5 | 94.7 | 61.3 | 68 |
| 80 | 87.9 | | 65.4 | |
| 100 | 83.6 | | 64.5 | |
| 125 | 78.3 | 85.1 | 62.2 | 67.9 |
| 160 | 76.2 | | 62.9 | |
| 200 | 75.3 | | 64.4 | |
| 250 | 74.2 | 78.4 | 65.5 | 69.4 |
| 315 | 70.9 | | 64.3 | |
| 400 | 68.8 | | 64 | |
| 500 | 68.8 | 72.9 | 65.5 | 69.6 |
| 630 | 67.3 | | 65.4 | |
| 800 | 66.7 | | 65.9 | |
| 1,000 | 67.5 | 71.7 | 67.5 | 71.7 |
| 1,250 | 67.2 | | 67.8 | |
| 1,600 | 64.1 | | 65.1 | |
| 2,000 | 61 | 66.5 | 62.2 | 67.6 |
| 2,500 | 59.1 | | 60.4 | |
| 3,150 | 58.9 | | 60.1 | |
| 4,000 | 58.6 | 63.6 | 59.6 | 64.5 |
| 5,000 | 59.5 | | 60.1 | |
| 6,300 | 60.6 | | 60.5 | |
| 8,000 | 62.4 | 67.2 | 61.3 | 65.8 |
| 10,000 | 64.2 | | 61.8 | |

*** OVERALL LEVELS (10 - 10000 Hz) ***

OASPL = 108.7 dB  OASLA = 77.9 dB(A)


TITLE: T-10/1 POS 8 AFTERBURNER
UNWEIGHTED SPL (dB)
A-WEIGHTED SL (dB(A))
LEVEL
120
110
100
90
80
70
60
50
10
12.5
16
20
25
31.5
40
50
63
80
100
125
160
200
250
315
400
500
630
800
1000
1250
1600
2000
2500
3150
4000
5000
6300
8000
10000
OVERALL
ONE-THIRD OCTAVE BAND CENTER FREQUENCY (Hz)

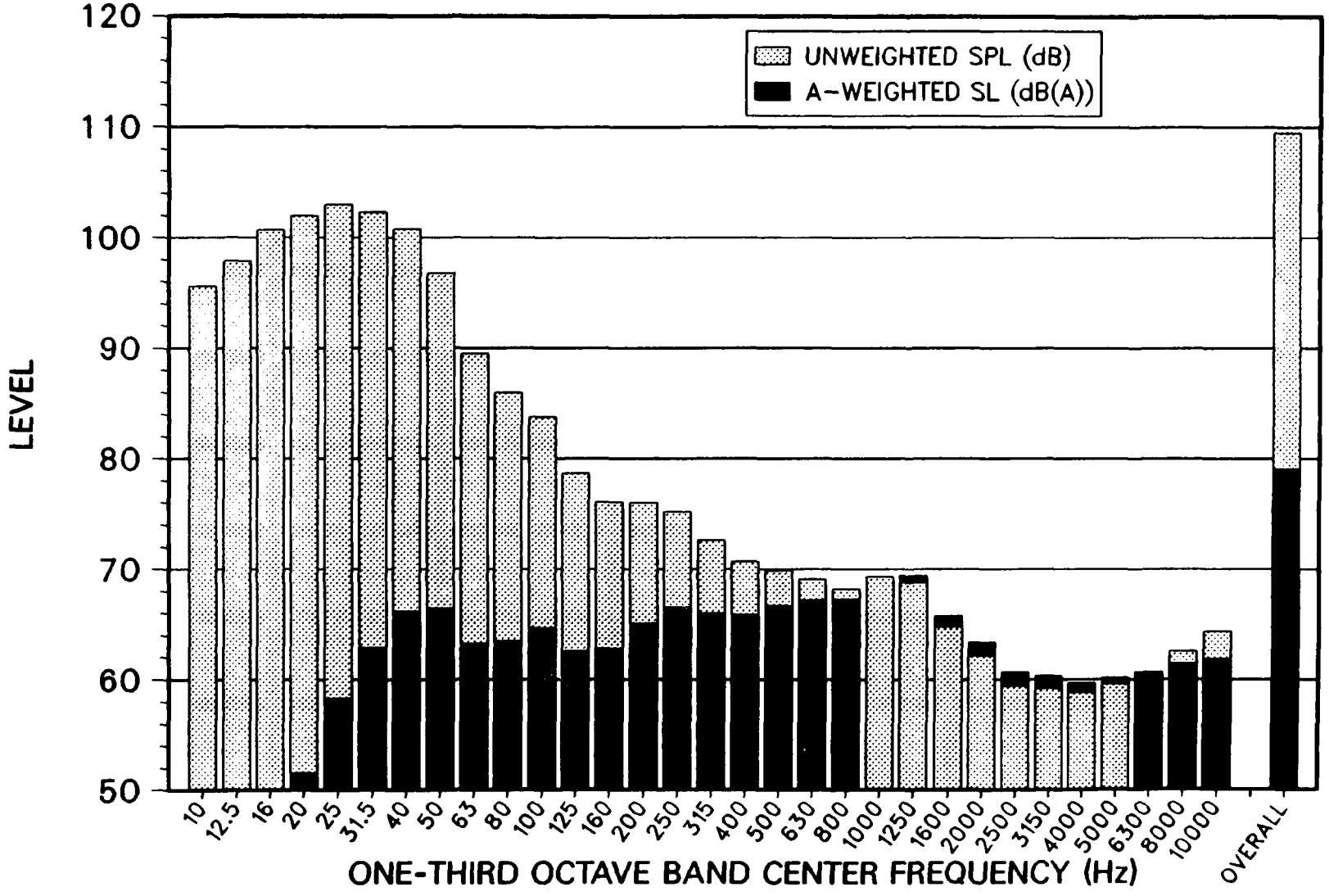
# TITLE: T-10/1 POS 9 AFTERBURNER

| FREQ (Hz) | SOUND PRESSURE LEVEL (dB) | OCTAVE BAND SPL (dB) | A-WEIGHTED SOUND LEVEL [dB(A)] | A-WEIGHTED OCTAVE BAND SL [dB(A)] |
|---|---|---|---|---|
| 10 | 95.6 | | 25.1 | |
| 12.5 | 97.9 | | 34.5 | |
| 16 | 100.7 | 105.1 | 44 | 52.2 |
| 20 | 102 | | 51.6 | |
| 25 | 103 | | 58.3 | |
| 31.5 | 102.3 | 106.7 | 62.9 | 68.1 |
| 40 | 100.8 | | 66.2 | |
| 50 | 96.8 | | 66.5 | |
| 63 | 89.5 | 97.6 | 63.3 | 69.3 |
| 80 | 86 | | 63.5 | |
| 100 | 83.8 | | 64.7 | |
| 125 | 78.7 | 85.3 | 62.6 | 68 |
| 160 | 76.1 | | 62.8 | |
| 200 | 76 | | 65.1 | |
| 250 | 75.2 | 79.4 | 66.6 | 70.5 |
| 315 | 72.6 | | 66 | |
| 400 | 70.7 | | 65.9 | |
| 500 | 69.9 | 74.5 | 66.7 | 71.2 |
| 630 | 69.1 | | 67.2 | |
| 800 | 68.2 | | 67.3 | |
| 1,000 | 69.3 | 73.4 | 69.3 | 73.4 |
| 1,250 | 68.8 | | 69.4 | |
| 1,600 | 64.8 | | 65.8 | |
| 2,000 | 62.2 | 67.3 | 63.4 | 68.4 |
| 2,500 | 59.4 | | 60.7 | |
| 3,150 | 59.2 | | 60.4 | |
| 4,000 | 58.8 | 63.8 | 59.7 | 64.7 |
| 5,000 | 59.6 | | 60.2 | |
| 6,300 | 60.7 | | 60.6 | |
| 8,000 | 62.6 | 67.4 | 61.5 | 65.9 |
| 10,000 | 64.4 | | 61.9 | |

**••• OVERALL LEVELS (10 - 10000 Hz) •••**

**OASPL = 109.6 dB  OASLA = 79.1 dB(A)**

# TITLE: T-10/1 POS 9 AFTERBURNER

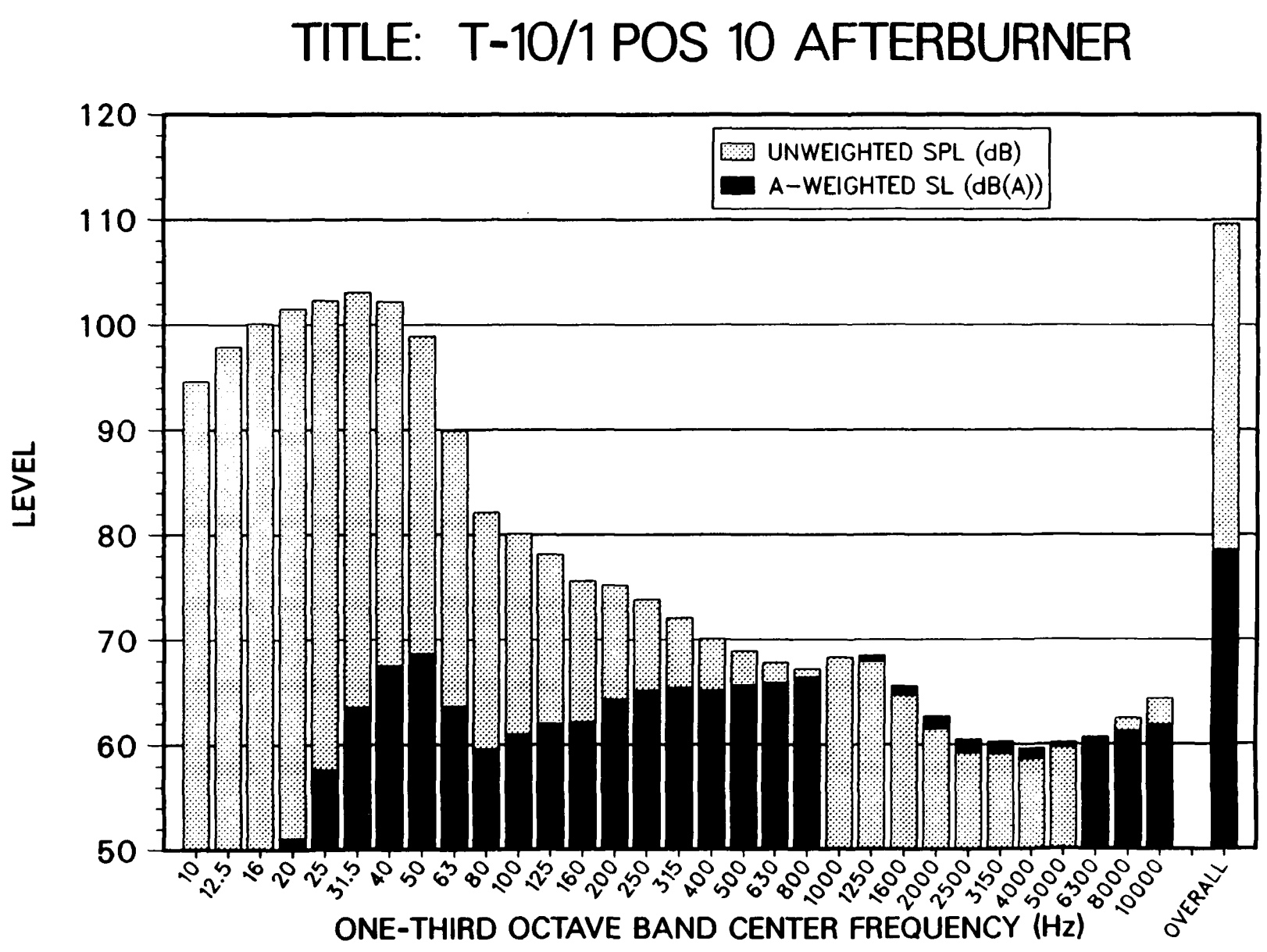


# TITLE: T-10/1 POS 10 AFTERBURNER

| FREQ (Hz) | SOUND PRESSURE LEVEL (dB) | OCTAVE BAND SPL (dB) | A-WEIGHTED SOUND LEVEL [dB(A)] | A-WEIGHTED OCTAVE BAND SL [dB(A)] |
|---|---|---|---|---|
| 10 | 94.6 | | 24.2 | |
| 12.5 | 97.9 | | 34.5 | |
| 16 | 100.1 | 104.7 | 43.5 | 51.7 |
| 20 | 101.5 | | 51.1 | |
| 25 | 102.3 | | 57.6 | |
| 31.5 | 103.1 | 107.1 | 63.6 | 69.1 |
| 40 | 102.2 | | 67.5 | |
| 50 | 98.9 | | 68.7 | |
| 63 | 89.9 | 99.3 | 63.7 | 70.1 |
| 80 | 82.1 | | 59.6 | |
| 100 | 80.1 | | 61 | |
| 125 | 78.1 | 82.9 | 62 | 66.3 |
| 160 | 75.6 | | 62.2 | |
| 200 | 75.2 | | 64.4 | |
| 250 | 73.8 | 78.5 | 65.2 | 69.6 |
| 315 | 72.1 | | 65.5 | |
| 400 | 70.1 | | 65.2 | |
| 500 | 68.9 | 73.6 | 65.7 | 70.2 |
| 630 | 67.8 | | 65.9 | |
| 800 | 67.2 | | 66.4 | |
| 1,000 | 68.3 | 72.4 | 68.3 | 72.4 |
| 1,250 | 67.9 | | 68.5 | |
| 1,600 | 64.7 | | 65.6 | |
| 2,000 | 61.5 | 66.9 | 62.7 | 68 |
| 2,500 | 59.2 | | 60.5 | |
| 3,150 | 59.1 | | 60.3 | |
| 4,000 | 58.6 | 63.7 | 59.6 | 64.6 |
| 5,000 | 59.7 | | 60.2 | |
| 6,300 | 60.7 | | 60.6 | |
| 8,000 | 62.5 | 67.4 | 61.3 | 65.9 |
| 10,000 | 64.4 | | 61.9 | |

**••• OVERALL LEVELS (10 - 10000 Hz) •••**

**OASPL = 109.6 dB  OASLA = 78.6 dB(A)**


TITLE: T-10/1 POS 10 AFTERBURNER
UNWEIGHTED SPL (dB)
A-WEIGHTED SL (dB(A))
LEVEL
120
110
100
90
80
70
60
50
10
12.5
16
20
25
31.5
40
50
63
80
100
125
160
200
250
315
400
500
630
800
1000
1250
1600
2000
2500
3150
4000
5000
6300
8000
10000
OVERALL
ONE-THIRD OCTAVE BAND CENTER FREQUENCY (Hz)

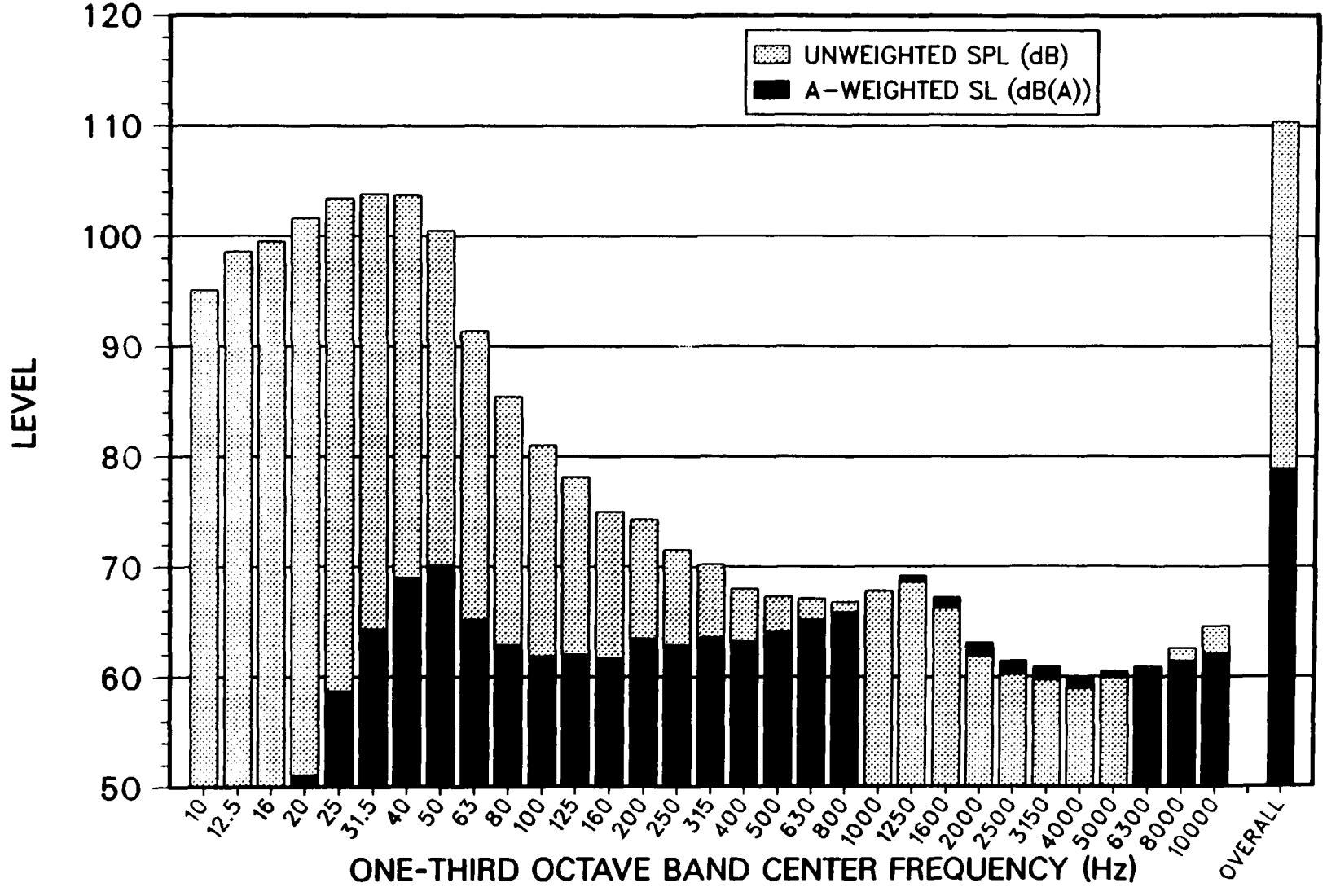
# TITLE: T-10/1 POS 11 AFTERBURNER

| FREQ (Hz) | SOUND PRESSURE LEVEL (dB) | OCTAVE BAND SPL (dB) | A-WEIGHTED SOUND LEVEL [dB(A)] | A-WEIGHTED OCTAVE BAND SL [dB(A)] |
|---|---|---|---|---|
| 10 | 95.1 | | 24.7 | |
| 12.5 | 98.6 | | 35.3 | |
| 16 | 99.5 | 104.7 | 42.8 | 51.6 |
| 20 | 101.6 | | 51.1 | |
| 25 | 103.4 | | 58.7 | |
| 31.5 | 103.8 | 108.2 | 64.4 | 70.4 |
| 40 | 103.7 | | 69 | |
| 50 | 100.5 | | 70.2 | |
| 63 | 91.4 | 100.9 | 65.2 | 71.8 |
| 80 | 85.4 | | 62.9 | |
| 100 | 81 | | 61.9 | |
| 125 | 78.1 | 83.3 | 62 | 66.4 |
| 160 | 75 | | 61.7 | |
| 200 | 74.3 | | 63.5 | |
| 250 | 71.5 | 76.9 | 62.9 | 67.9 |
| 315 | 70.2 | | 63.6 | |
| 400 | 68 | | 63.2 | |
| 500 | 67.3 | 72.1 | 64.1 | 68.8 |
| 630 | 67.1 | | 65.2 | |
| 800 | 66.8 | | 65.9 | |
| 1,000 | 67.8 | 72.4 | 67.8 | 72.4 |
| 1,250 | 68.6 | | 69.2 | |
| 1,600 | 66.2 | | 67.2 | |
| 2,000 | 61.9 | 68.1 | 63.1 | 69.2 |
| 2,500 | 60.2 | | 61.5 | |
| 3,150 | 59.7 | | 60.9 | |
| 4,000 | 58.9 | 64.1 | 59.8 | 65 |
| 5,000 | 59.9 | | 60.5 | |
| 6,300 | 60.9 | | 60.7 | |
| 8,000 | 62.6 | 67.5 | 61.5 | 66.1 |
| 10,000 | 64.6 | | 62.1 | |

*** OVERALL LEVELS (10 - 10000 Hz) ***

OASPL = 110.4 dB  OASLA = 78.9 dB(A)

# TITLE: T-10/1 POS 11 AFTERBURNER



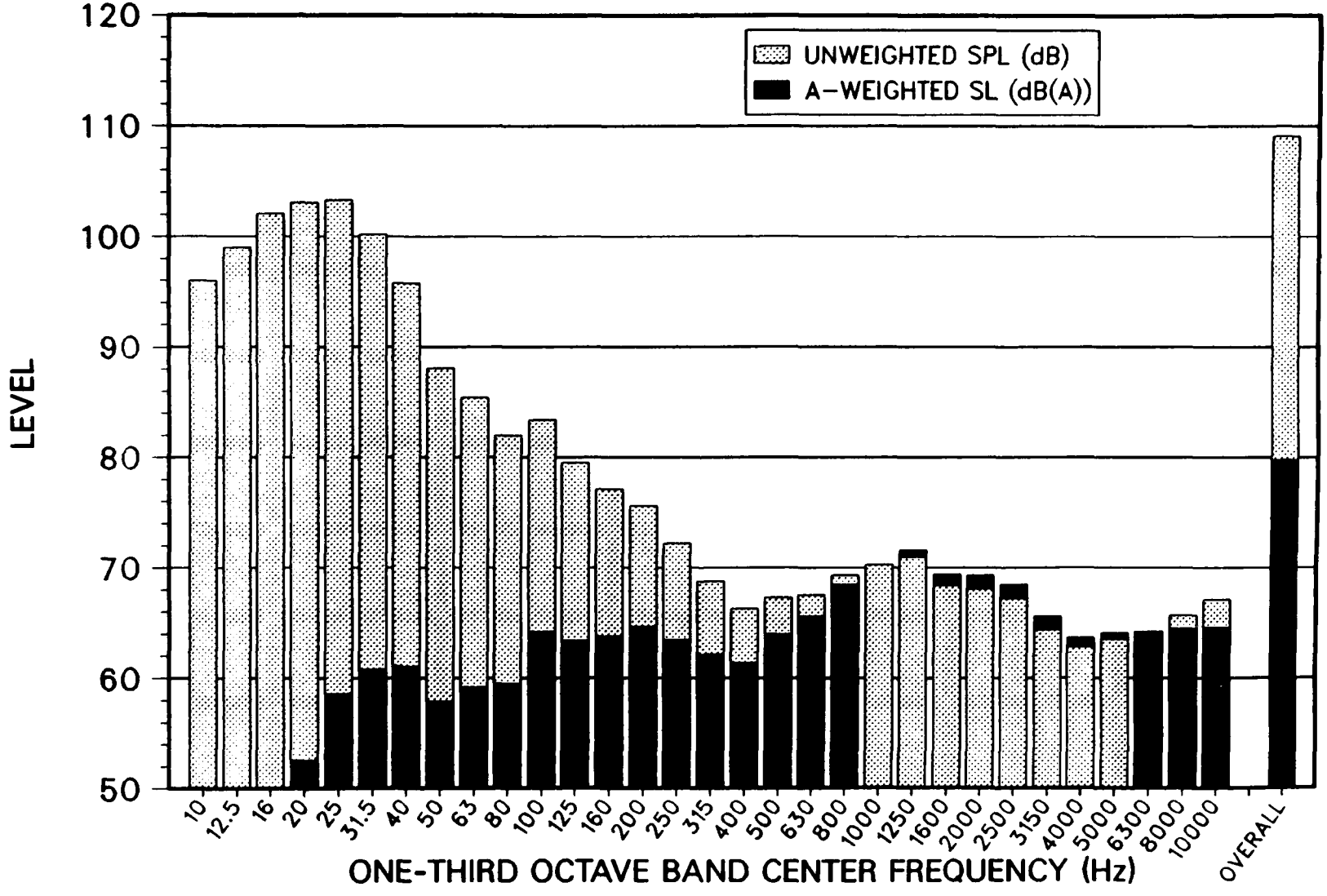
# TITLE: T-10/2 POS 6 AFTERBURNER

| FREQ (Hz) | SOUND PRESSURE LEVEL (dB) | OCTAVE BAND SPL (dB) | A-WEIGHTED SOUND LEVEL [dB(A)] | A-WEIGHTED OCTAVE BAND SL [dB(A)] |
|---|---|---|---|---|
| 10 | 96 | | 25.6 | |
| 12.5 | 99 | | 35.6 | |
| 16 | 102.1 | 106.3 | 45.4 | 53.3 |
| 20 | 103.1 | | 52.6 | |
| 25 | 103.3 | | 58.6 | |
| 31.5 | 100.2 | 105.3 | 60.8 | 64.9 |
| 40 | 95.8 | | 61.1 | |
| 50 | 88.1 | | 57.9 | |
| 63 | 85.4 | 90.4 | 59.2 | 63.5 |
| 80 | 82 | | 59.5 | |
| 100 | 83.4 | | 64.2 | |
| 125 | 79.5 | 85.3 | 63.4 | 68.4 |
| 160 | 77.1 | | 63.8 | |
| 200 | 75.6 | | 64.7 | |
| 250 | 72.2 | 77.6 | 63.5 | 68.2 |
| 315 | 68.8 | | 62.2 | |
| 400 | 66.3 | | 61.4 | |
| 500 | 67.3 | 71.6 | 64 | 68.6 |
| 630 | 67.5 | | 65.6 | |
| 800 | 69.3 | | 68.5 | |
| 1,000 | 70.3 | 74.8 | 70.3 | 74.9 |
| 1,250 | 71 | | 71.6 | |
| 1,600 | 68.4 | | 69.4 | |
| 2,000 | 68.1 | 72.5 | 69.3 | 73.6 |
| 2,500 | 67.2 | | 68.5 | |
| 3,150 | 64.4 | | 65.6 | |
| 4,000 | 62.8 | 68.2 | 63.7 | 69.1 |
| 5,000 | 63.5 | | 64.1 | |
| 6,300 | 64.2 | | 64.1 | |
| 8,000 | 65.7 | 70.4 | 64.5 | 69 |
| 10,000 | 67.1 | | 64.6 | |

***** OVERALL LEVELS (10 - 10000 Hz) *****

**OASPL = 109.1 dB  OASLA = 79.8 dB(A)**

# TITLE: T-10/2 POS 6 AFTERBURNER



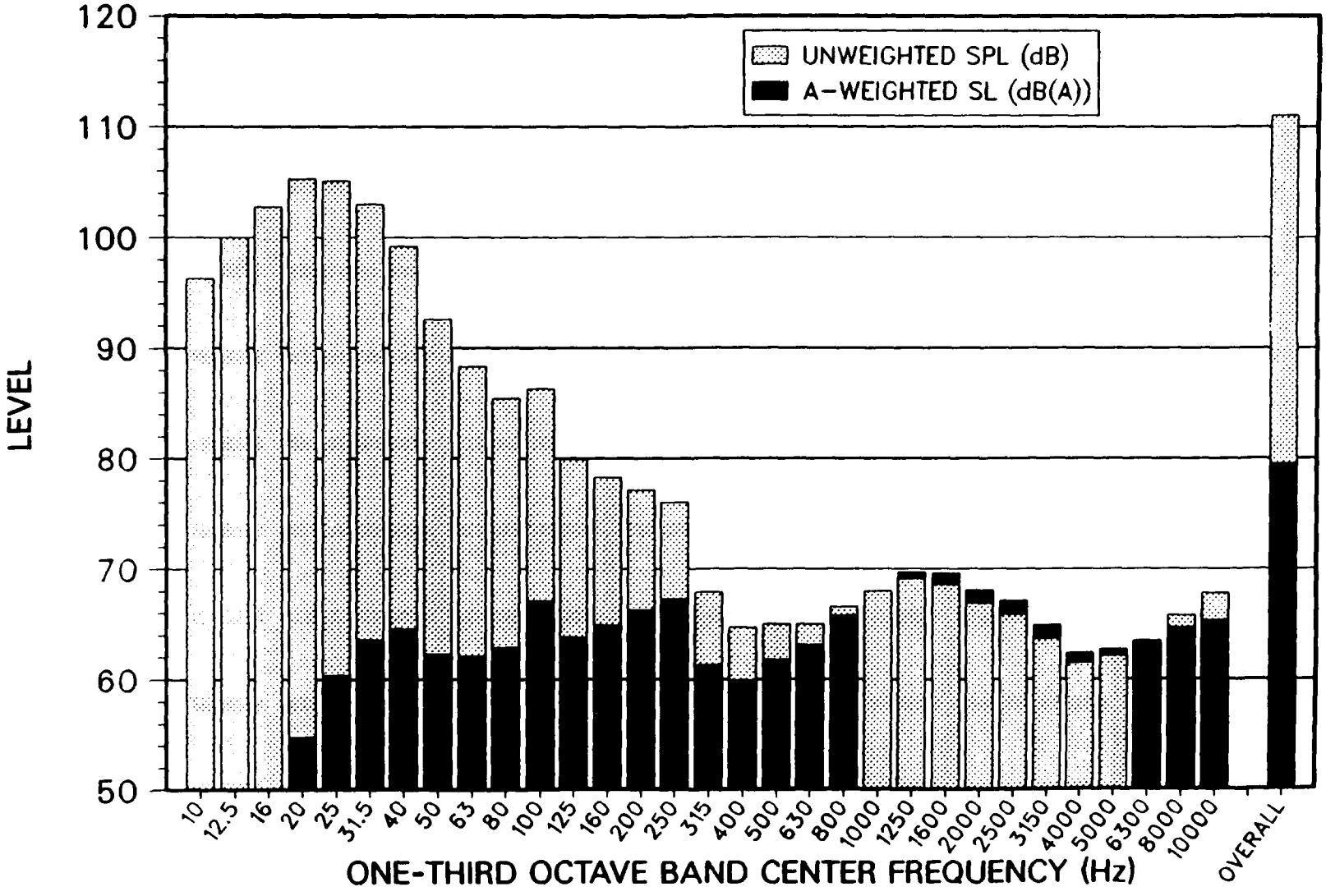
# TITLE: T-10/2 POS 7 AFTERBURNER

| FREQ (Hz) | SOUND PRESSURE LEVEL (dB) | OCTAVE BAND SPL (dB) | A-WEIGHTED SOUND LEVEL [dB(A)] | A-WEIGHTED OCTAVE BAND SL [dB(A)] |
|---|---|---|---|---|
| 10 | 96.3 | | 25.9 | |
| 12.5 | 100 | | 36.6 | |
| 16 | 102.8 | 107.8 | 46.1 | 55.2 |
| 20 | 105.3 | | 54.8 | |
| 25 | 105.1 | | 60.4 | |
| 31.5 | 103 | 107.6 | 63.6 | 67.8 |
| 40 | 99.2 | | 64.6 | |
| 50 | 92.6 | | 62.3 | |
| 63 | 88.3 | 94.3 | 62.1 | 67 |
| 80 | 85.4 | | 62.9 | |
| 100 | 86.3 | | 67.1 | |
| 125 | 79.9 | 87.5 | 63.8 | 70.1 |
| 160 | 78.3 | | 64.9 | |
| 200 | 77.1 | | 66.3 | |
| 250 | 76 | 79.7 | 67.3 | 70.2 |
| 315 | 67.9 | | 61.3 | |
| 400 | 64.7 | | 59.9 | |
| 500 | 65 | 69.5 | 61.8 | 66.4 |
| 630 | 65 | | 63.1 | |
| 800 | 66.6 | | 65.8 | |
| 1,000 | 68 | 72.6 | 68 | 72.7 |
| 1,250 | 69.1 | | 69.7 | |
| 1,600 | 68.6 | | 69.6 | |
| 2,000 | 66.9 | 71.8 | 68.1 | 73 |
| 2,500 | 65.9 | | 67.1 | |
| 3,150 | 63.7 | | 64.9 | |
| 4,000 | 61.5 | 67.1 | 62.4 | 68 |
| 5,000 | 62.1 | | 62.7 | |
| 6,300 | 63.5 | | 63.4 | |
| 8,000 | 65.8 | 70.6 | 64.7 | 69.1 |
| 10,000 | 67.8 | | 65.3 | |

**••• OVERALL LEVELS (10 - 10000 Hz) •••**

**OASPL = 111 dB  OASLA = 79.5 dB(A)**

# TITLE: T-10/2 POS 7 AFTERBURNER



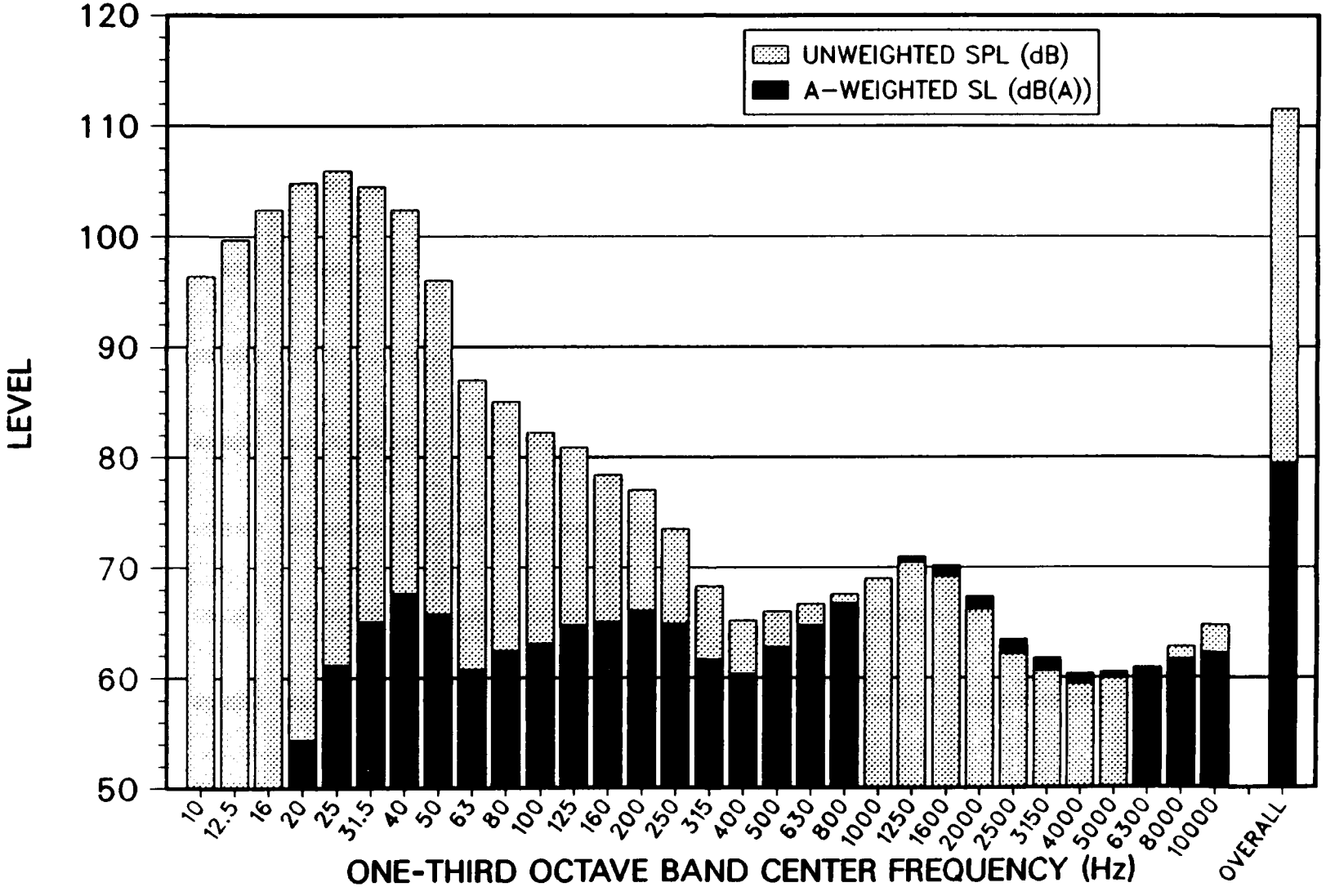
# TITLE: T-10/2 POS 8 AFTERBURNER

| FREQ (Hz) | SOUND PRESSURE LEVEL (dB) | OCTAVE BAND SPL (dB) | A-WEIGHTED SOUND LEVEL [dB(A)] | A-WEIGHTED OCTAVE BAND SL [dB(A)] |
|---|---|---|---|---|
| 10 | 96.4 | | 25.9 | |
| 12.5 | 99.7 | | 36.3 | |
| 16 | 102.4 | 107.4 | 45.8 | 54.8 |
| 20 | 104.8 | | 54.4 | |
| 25 | 105.9 | | 61.2 | |
| 31.5 | 104.5 | 109.1 | 65.1 | 70 |
| 40 | 102.4 | | 67.7 | |
| 50 | 96 | | 65.8 | |
| 63 | 87 | 96.6 | 60.8 | 68.1 |
| 80 | 85 | | 62.5 | |
| 100 | 82.2 | | 63.1 | |
| 125 | 80.9 | 85.3 | 64.8 | 69 |
| 160 | 78.4 | | 65.1 | |
| 200 | 77 | | 66.1 | |
| 250 | 73.5 | 78.8 | 64.9 | 69.2 |
| 315 | 68.3 | | 61.7 | |
| 400 | 65.2 | | 60.4 | |
| 500 | 66 | 70.6 | 62.8 | 67.6 |
| 630 | 66.7 | | 64.8 | |
| 800 | 67.6 | | 66.8 | |
| 1,000 | 69 | 73.8 | 69 | 73.9 |
| 1,250 | 70.4 | | 71 | |
| 1,600 | 69.2 | | 70.2 | |
| 2,000 | 66.2 | 71.3 | 67.4 | 72.4 |
| 2,500 | 62.2 | | 63.5 | |
| 3,150 | 60.6 | | 61.8 | |
| 4,000 | 59.4 | 64.6 | 60.4 | 65.5 |
| 5,000 | 59.9 | | 60.5 | |
| 6,300 | 60.9 | | 60.8 | |
| 8,000 | 62.8 | 67.7 | 61.7 | 66.2 |
| 10,000 | 64.8 | | 62.3 | |

**••• OVERALL LEVELS (10 - 10000 Hz) •••**

**OASPL = 111.6 dB  OASLA = 79.5 dB(A)**

# TITLE: T-10/2 POS 8 AFTERBURNER

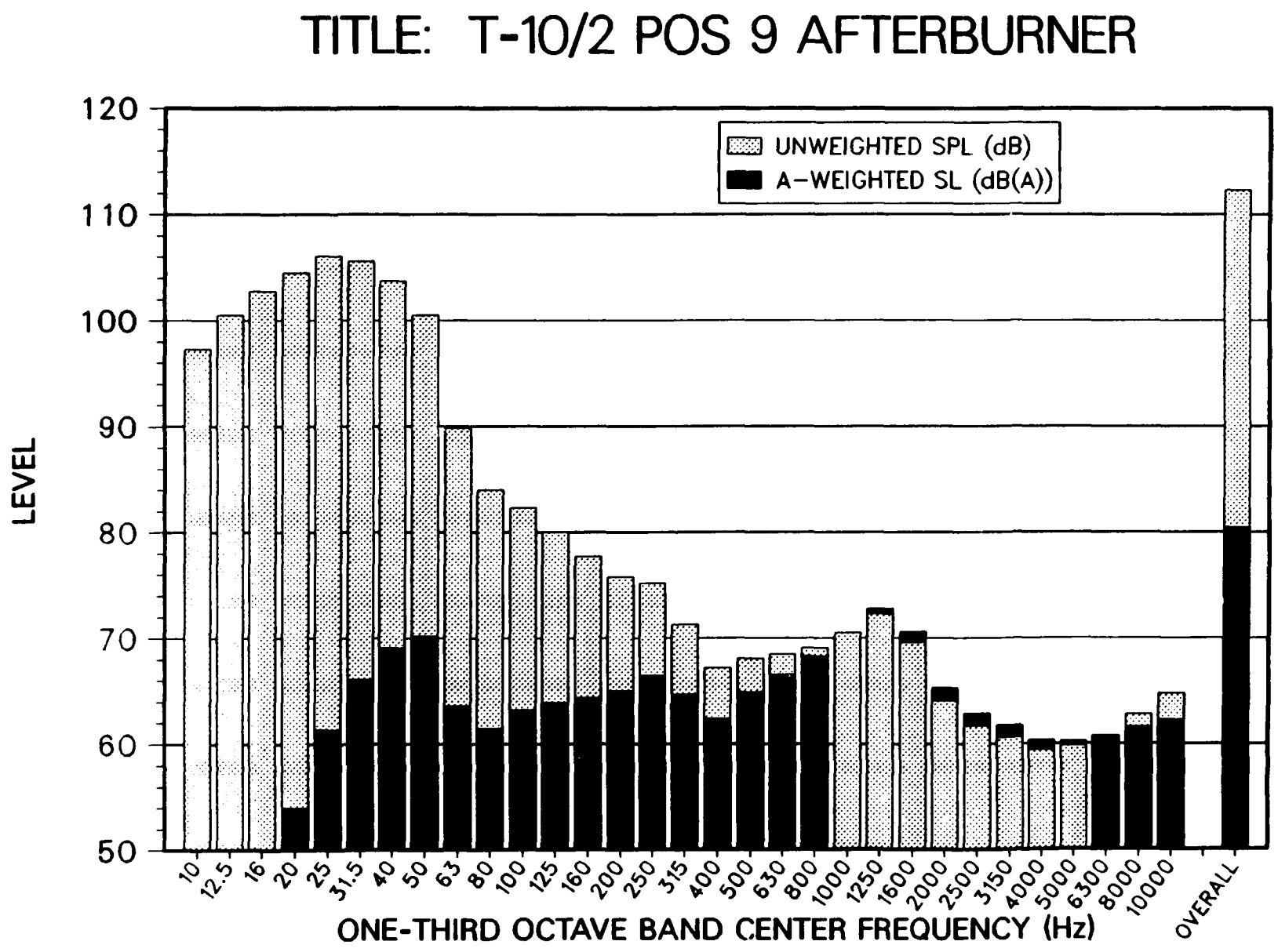


# TITLE: T-10/2 POS 9 AFTERBURNER

| FREQ (Hz) | SOUND PRESSURE LEVEL (dB) | OCTAVE BAND SPL (dB) | A-WEIGHTED SOUND LEVEL [dB(A)] | A-WEIGHTED OCTAVE BAND SL [dB(A)] |
|---|---|---|---|---|
| 10 | 97.3 | | 26.9 | |
| 12.5 | 100.5 | | 37.2 | |
| 16 | 102.8 | 107.5 | 46.1 | 54.6 |
| 20 | 104.5 | | 54 | |
| 25 | 106.1 | | 61.4 | |
| 31.5 | 105.6 | 109.8 | 66.1 | 71.2 |
| 40 | 103.7 | | 69.1 | |
| 50 | 100.5 | | 70.2 | |
| 63 | 89.8 | 100.7 | 63.6 | 71.4 |
| 80 | 84 | | 61.5 | |
| 100 | 82.3 | | 63.2 | |
| 125 | 80 | 85 | 63.9 | 68.4 |
| 160 | 77.7 | | 64.4 | |
| 200 | 75.8 | | 65 | |
| 250 | 75.2 | 79.1 | 66.5 | 70.1 |
| 315 | 71.3 | | 64.7 | |
| 400 | 67.2 | | 62.4 | |
| 500 | 68.1 | 72.6 | 64.9 | 69.6 |
| 630 | 68.5 | | 66.6 | |
| 800 | 69.1 | | 68.3 | |
| 1,000 | 70.5 | 75.4 | 70.5 | 75.5 |
| 1,250 | 72.3 | | 72.8 | |
| 1,600 | 69.6 | | 70.6 | |
| 2,000 | 64.1 | 71 | 65.3 | 72.1 |
| 2,500 | 61.7 | | 62.9 | |
| 3,150 | 60.6 | | 61.8 | |
| 4,000 | 59.4 | 64.5 | 60.4 | 65.5 |
| 5,000 | 59.8 | | 60.3 | |
| 6,300 | 60.8 | | 60.7 | |
| 8,000 | 62.8 | 67.7 | 61.6 | 66.2 |
| 10,000 | 64.8 | | 62.3 | |

***** OVERALL LEVELS (10 - 10000 Hz) *****

**OASPL = 112.3 dB  OASLA = 80.5 dB(A)**

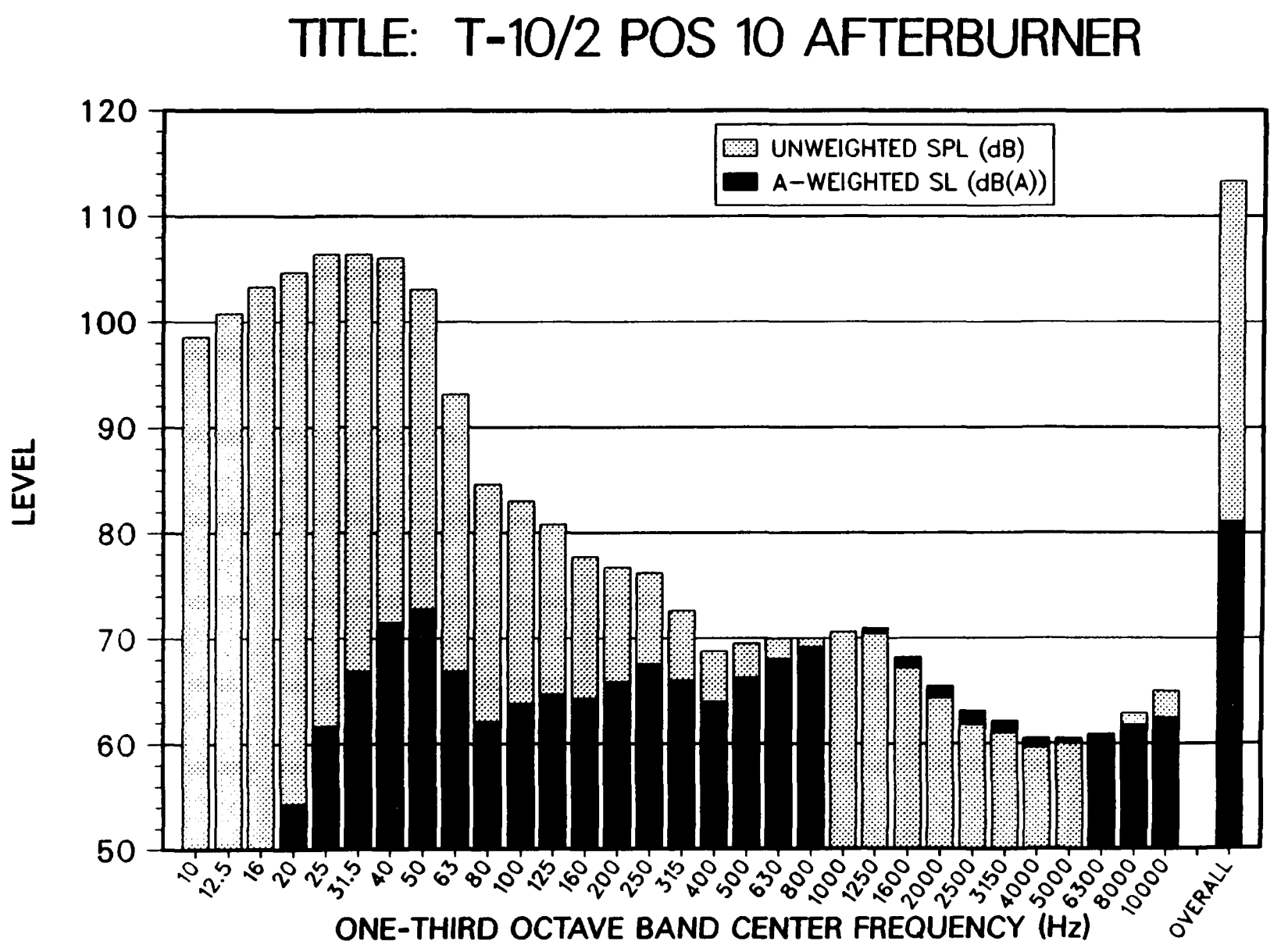

TITLE: T-10/2 POS 9 AFTERBURNER
UNWEIGHTED SPL (dB)
A-WEIGHTED SL (dB(A))
LEVEL
120
110
100
90
80
70
60
50
10
12.5
16
20
25
31.5
40
50
63
80
100
125
160
200
250
315
400
500
630
800
1000
1250
1600
2000
2500
3150
4000
5000
6300
8000
10000
OVERALL
ONE-THIRD OCTAVE BAND CENTER FREQUENCY (Hz)

# TITLE: T-10/2 POS 10 AFTERBURNER

| FREQ (Hz) | SOUND PRESSURE LEVEL (dB) | OCTAVE BAND SPL (dB) | A-WEIGHTED SOUND LEVEL [dB(A)] | A-WEIGHTED OCTAVE BAND SL [dB(A)] |
|---|---|---|---|---|
| 10 | 98.6 | | 28.2 | |
| 12.5 | 100.8 | | 37.4 | |
| 16 | 103.3 | 107.8 | 46.7 | 54.9 |
| 20 | 104.7 | | 54.3 | |
| 25 | 106.4 | | 61.7 | |
| 31.5 | 106.4 | 110.9 | 66.9 | 72.9 |
| 40 | 106.1 | | 71.5 | |
| 50 | 103.1 | | 72.8 | |
| 63 | 93.1 | 103.4 | 66.9 | 73.9 |
| 80 | 84.6 | | 62.1 | |
| 100 | 83 | | 63.8 | |
| 125 | 80.8 | 85.6 | 64.7 | 68.9 |
| 160 | 77.7 | | 64.3 | |
| 200 | 76.7 | | 65.9 | |
| 250 | 76.2 | 80.1 | 67.6 | 71.1 |
| 315 | 72.6 | | 66 | |
| 400 | 68.8 | | 64 | |
| 500 | 69.5 | 74.1 | 66.3 | 71.1 |
| 630 | 70 | | 68.1 | |
| 800 | 70 | | 69.2 | |
| 1,000 | 70.6 | 74.9 | 70.6 | 74.9 |
| 1,250 | 70.4 | | 71 | |
| 1,600 | 67.2 | | 68.2 | |
| 2,000 | 64.3 | 69.6 | 65.5 | 70.7 |
| 2,500 | 61.8 | | 63.1 | |
| 3,150 | 61 | | 62.2 | |
| 4,000 | 59.6 | 64.8 | 60.5 | 65.7 |
| 5,000 | 60 | | 60.5 | |
| 6,300 | 60.9 | | 60.7 | |
| 8,000 | 62.9 | 67.8 | 61.8 | 66.3 |
| 10,000 | 65 | | 62.5 | |

***** OVERALL LEVELS (10 - 10000 Hz) *****

**OASPL = 113.3 dB  OASLA = 81.1 dB(A)**

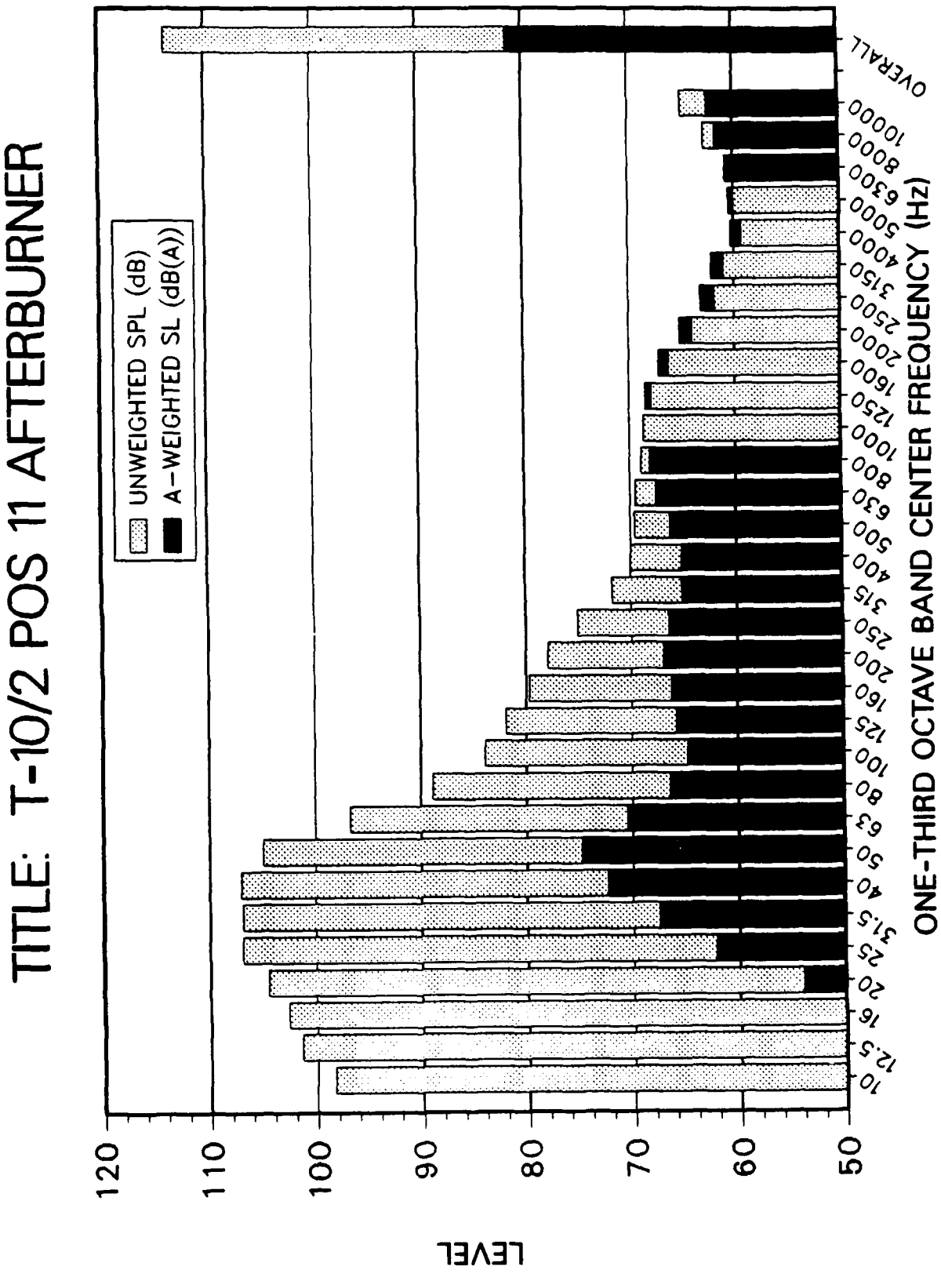

TITLE: T-10/2 POS 10 AFTERBURNER
UNWEIGHTED SPL (dB)
A-WEIGHTED SL (dB(A))
LEVEL
120
110
100
90
80
70
60
50
10
12.5
16
20
25
31.5
40
50
63
80
100
125
160
200
250
315
400
500
630
800
1000
1250
1600
2000
2500
3150
4000
5000
6300
8000
10000
OVERALL
ONE-THIRD OCTAVE BAND CENTER FREQUENCY (Hz)

# TITLE: T-10/2 POS 11 AFTERBURNER

| FREQ (Hz) | SOUND PRESSURE LEVEL (dB) | OCTAVE BAND SPL (dB) | A-WEIGHTED SOUND LEVEL [dB(A)] | A-WEIGHTED OCTAVE BAND SL [dB(A)] |
|---|---|---|---|---|
| 10 | 98.3 | | 27.9 | |
| 12.5 | 101.4 | | 38.1 | |
| 16 | 102.6 | 107.6 | 45.9 | 54.5 |
| 20 | 104.5 | | 54 | |
| 25 | 106.9 | | 62.2 | |
| 31.5 | 106.9 | 111.5 | 67.5 | 73.7 |
| 40 | 107 | | 72.4 | |
| 50 | 105 | | 74.8 | |
| 63 | 96.7 | 105.5 | 70.5 | 76.4 |
| 80 | 88.9 | | 66.4 | |
| 100 | 83.9 | | 64.8 | |
| 125 | 81.9 | 86.8 | 65.8 | 70.3 |
| 160 | 79.7 | | 66.3 | |
| 200 | 77.9 | | 67 | |
| 250 | 75.1 | 80.2 | 66.5 | 70.9 |
| 315 | 71.8 | | 65.2 | |
| 400 | 70 | | 65.2 | |
| 500 | 69.6 | 74.3 | 66.3 | 71 |
| 630 | 69.5 | | 67.6 | |
| 800 | 68.9 | | 68.1 | |
| 1,000 | 68.7 | 73.1 | 68.7 | 73 |
| 1,250 | 67.9 | | 68.5 | |
| 1,600 | 66.3 | | 67.2 | |
| 2,000 | 64 | 69 | 65.2 | 70.1 |
| 2,500 | 61.9 | | 63.2 | |
| 3,150 | 61 | | 62.2 | |
| 4,000 | 59.3 | 64.7 | 60.3 | 65.7 |
| 5,000 | 60 | | 60.5 | |
| 6,300 | 60.8 | | 60.7 | |
| 8,000 | 62.8 | 67.8 | 61.7 | 66.3 |
| 10,000 | 65 | | 62.5 | |

••• OVERALL LEVELS (10 - 10000 Hz) •••

OASPL = 113.8 dB  OASLA = 81.5 dB(A)

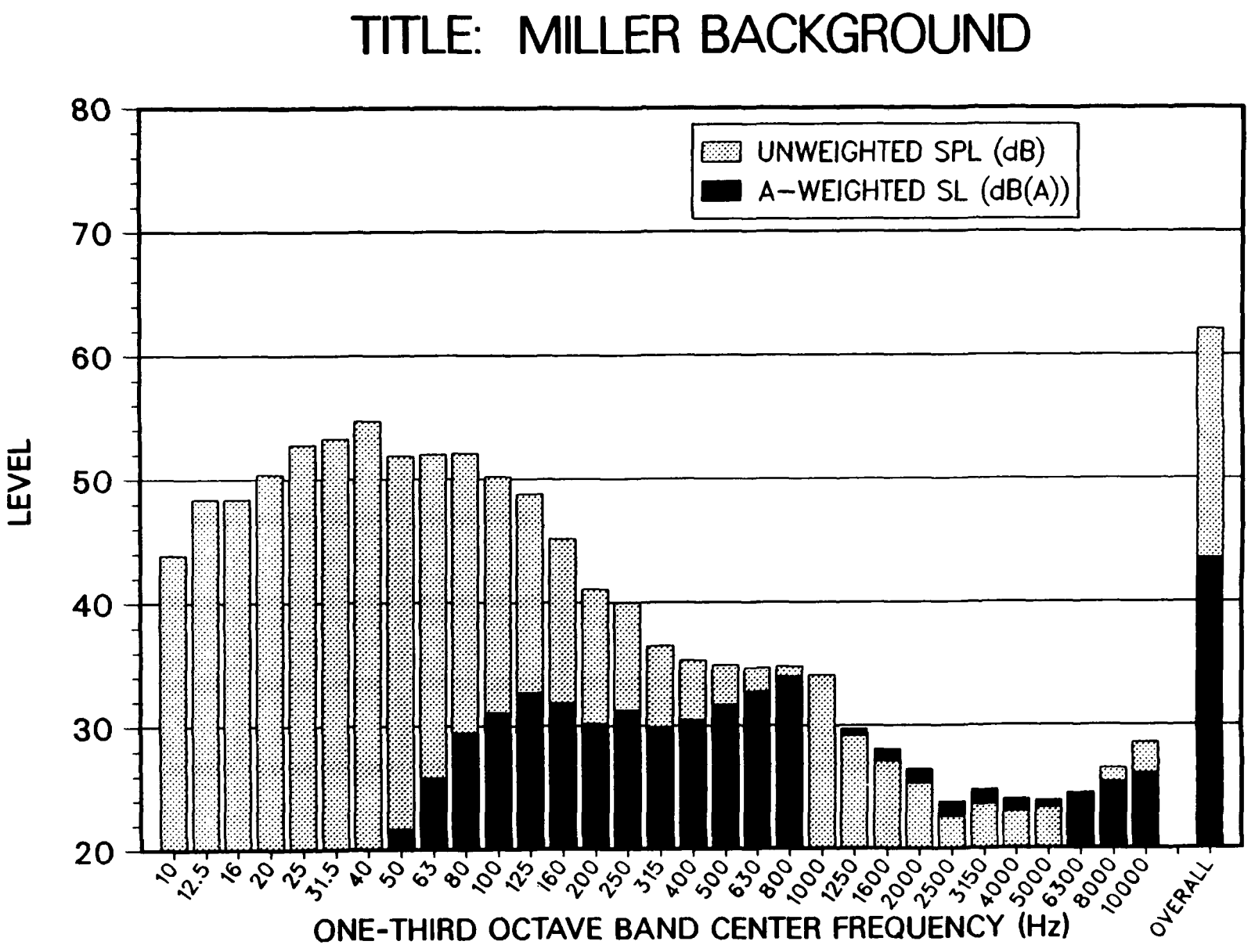

TITLE: T-10/2 POS 11 AFTERBURNER
UNWEIGHTED SPL (dB)
A-WEIGHTED SL (dB(A))
LEVEL
120
110
100
90
80
70
60
50
ONE-THIRD OCTAVE BAND CENTER FREQUENCY (Hz)
10
12.5
16
20
25
31.5
40
50
63
80
100
125
160
200
250
315
400
500
630
800
1000
1250
1600
2000
2500
3150
4000
5000
6300
8000
10000
OVERALL

# TITLE: MILLER BACKGROUND

| FREQ (Hz) | SOUND PRESSURE LEVEL (dB) | OCTAVE BAND SPL (dB) | A-WEIGHTED SOUND LEVEL [dB(A)] | A-WEIGHTED OCTAVE BAND SL [dB(A)] |
|---|---|---|---|---|
| 10 | 43.9 | | 0 | |
| 12.5 | 48.4 | | 0 | |
| 16 | 48.4 | 53.7 | 0 | 0.5 |
| 20 | 50.4 | | 0 | |
| 25 | 52.8 | | 8.1 | |
| 31.5 | 53.3 | 58.3 | 13.8 | 21 |
| 40 | 54.7 | | 20.1 | |
| 50 | 51.9 | | 21.7 | |
| 63 | 52 | 56.6 | 25.8 | 31.4 |
| 80 | 52.1 | | 29.5 | |
| 100 | 50.2 | | 31.1 | |
| 125 | 48.8 | 53.1 | 32.7 | 36.5 |
| 160 | 45.2 | | 31.9 | |
| 200 | 41.1 | | 30.2 | |
| 250 | 40 | 44.2 | 31.3 | 35.1 |
| 315 | 36.5 | | 29.9 | |
| 400 | 35.3 | | 30.5 | |
| 500 | 34.9 | 39.6 | 31.7 | 36.4 |
| 630 | 34.7 | | 32.8 | |
| 800 | 34.8 | | 34 | |
| 1,000 | 34.1 | 37.9 | 34.1 | 37.6 |
| 1,250 | 29.2 | | 29.7 | |
| 1,600 | 27.1 | | 28.1 | |
| 2,000 | 25.3 | 29.9 | 26.5 | 31.1 |
| 2,500 | 22.6 | | 23.8 | |
| 3,150 | 23.6 | | 24.8 | |
| 4,000 | 23 | 27.9 | 24 | 28.8 |
| 5,000 | 23.3 | | 23.9 | |
| 6,300 | 24.5 | | 24.4 | |
| 8,000 | 26.5 | 31.4 | 25.4 | 29.9 |
| 10,000 | 28.6 | | 26.1 | |

*** OVERALL LEVELS (10 - 10000 Hz) ***

OASPL = 62.1 dB  OASLA = 43.6 dB(A)


TITLE: MILLER BACKGROUND
UNWEIGHTED SPL (dB)
A-WEIGHTED SL (dB(A))
LEVEL
80
70
60
50
40
30
20
10
12.5
16
20
25
31.5
40
50
63
80
100
125
160
200
250
315
400
500
630
800
1000
1250
1600
2000
2500
3150
4000
5000
6300
8000
10000
OVERALL
ONE-THIRD OCTAVE BAND CENTER FREQUENCY (Hz)

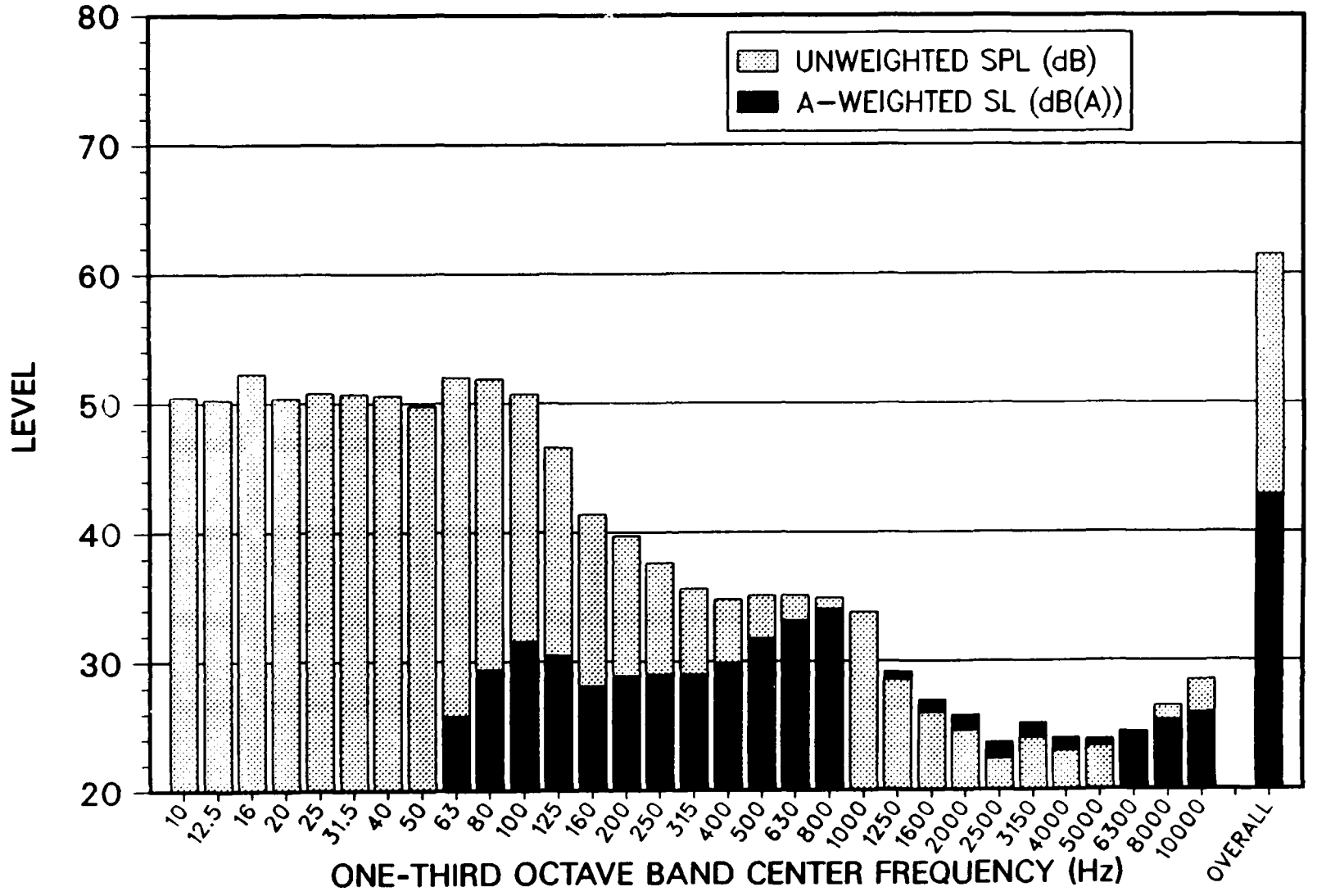
# TITLE: MILLER T-10/1 AFTERBURNER

| FREQ (Hz) | SOUND PRESSURE LEVEL (dB) | OCTAVE BAND SPL (dB) | A-WEIGHTED SOUND LEVEL [dB(A)] | A-WEIGHTED OCTAVE BAND SL [dB(A)] |
|---|---|---|---|---|
| 10 | 50.5 | | 0 | |
| 12.5 | 50.3 | | 0 | |
| 16 | 52.3 | 55.7 | 0 | 1.3 |
| 20 | 50.4 | | 0 | |
| 25 | 50.8 | | 6.1 | |
| 31.5 | 50.7 | 55.3 | 11.3 | 17.3 |
| 40 | 50.6 | | 15.9 | |
| 50 | 49.8 | | 19.5 | |
| 63 | 52 | 55.9 | 25.8 | 31.1 |
| 80 | 51.9 | | 29.4 | |
| 100 | 50.7 | | 31.6 | |
| 125 | 46.6 | 52.3 | 30.5 | 34.8 |
| 160 | 41.4 | | 28.1 | |
| 200 | 39.7 | | 28.9 | |
| 250 | 37.6 | 42.6 | 29 | 33.5 |
| 315 | 35.6 | | 29 | |
| 400 | 34.8 | | 29.9 | |
| 500 | 35.1 | 39.5 | 31.8 | 36.4 |
| 630 | 35.1 | | 33.2 | |
| 800 | 34.9 | | 34.1 | |
| 1,000 | 33.8 | 37.7 | 33.8 | 37.4 |
| 1,250 | 28.6 | | 29.2 | |
| 1,600 | 26 | | 27 | |
| 2,000 | 24.6 | 29.2 | 25.8 | 30.3 |
| 2,500 | 22.4 | | 23.7 | |
| 3,150 | 24 | | 25.2 | |
| 4,000 | 23 | 28 | 24 | 29 |
| 5,000 | 23.3 | | 23.9 | |
| 6,300 | 24.5 | | 24.4 | |
| 8,000 | 26.5 | 31.4 | 25.4 | 29.9 |
| 10,000 | 28.5 | | 26 | |

••• OVERALL LEVELS (10 - 10000 Hz) •••

OASPL = 61.5 dB  OASLA = 42.9 dB(A)

# TITLE: MILLER T-10/1 AFTERBURNER

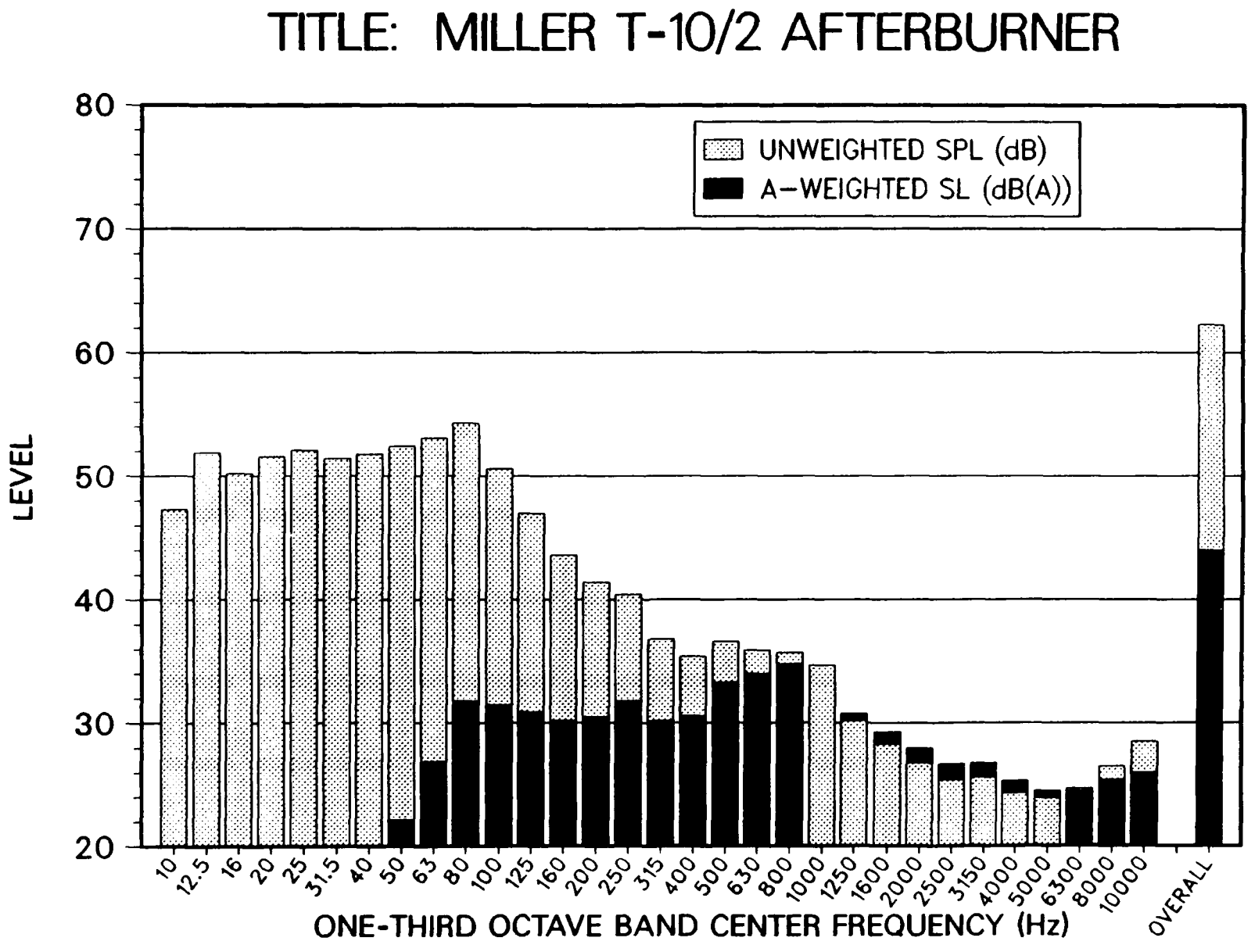


# TITLE: MILLER T-10/2 AFTERBURNER

| FREQ (Hz) | SOUND PRESSURE LEVEL (dB) | OCTAVE BAND SPL (dB) | A-WEIGHTED SOUND LEVEL [dB(A)] | A-WEIGHTED OCTAVE BAND SL [dB(A)] |
|---|---|---|---|---|
| 10 | 47.3 | | 0 | |
| 12.5 | 51.9 | | 0 | |
| 16 | 50.2 | 55.9 | 0 | 1.9 |
| 20 | 51.6 | | 1.2 | |
| 25 | 52.1 | | 7.4 | |
| 31.5 | 51.4 | 56.3 | 12 | 18.5 |
| 40 | 51.8 | | 17.2 | |
| 50 | 52.4 | | 22.2 | |
| 63 | 53.1 | 57.9 | 26.9 | 33.1 |
| 80 | 54.3 | | 31.8 | |
| 100 | 50.6 | | 31.5 | |
| 125 | 47 | 52.5 | 30.9 | 35.5 |
| 160 | 43.6 | | 30.2 | |
| 200 | 41.4 | | 30.5 | |
| 250 | 40.4 | 44.5 | 31.8 | 35.5 |
| 315 | 36.8 | | 30.2 | |
| 400 | 35.4 | | 30.6 | |
| 500 | 36.6 | 40.5 | 33.3 | 37.4 |
| 630 | 35.9 | | 34 | |
| 800 | 35.7 | | 34.8 | |
| 1,000 | 34.7 | 38.6 | 34.7 | 38.4 |
| 1,250 | 30.2 | | 30.8 | |
| 1,600 | 28.3 | | 29.3 | |
| 2,000 | 26.8 | 31.6 | 28 | 32.7 |
| 2,500 | 25.4 | | 26.7 | |
| 3,150 | 25.6 | | 26.8 | |
| 4,000 | 24.3 | 29.2 | 25.3 | 30.2 |
| 5,000 | 23.9 | | 24.5 | |
| 6,300 | 24.7 | | 24.5 | |
| 8,000 | 26.5 | 31.4 | 25.4 | 29.9 |
| 10,000 | 28.5 | | 26 | |

***** OVERALL LEVELS (10 - 10000 Hz) *****

**OASPL = 62.3 dB  OASLA = 44 dB(A)**


TITLE: MILLER T-10/2 AFTERBURNER
UNWEIGHTED SPL (dB)
A-WEIGHTED SL (dB(A))
LEVEL
80
70
60
50
40
30
20
10
12.5
16
20
25
31.5
40
50
63
80
100
125
160
200
250
315
400
500
630
800
1000
1250
1600
2000
2500
3150
4000
5000
6300
8000
10000
OVERALL
ONE-THIRD OCTAVE BAND CENTER FREQUENCY (Hz)

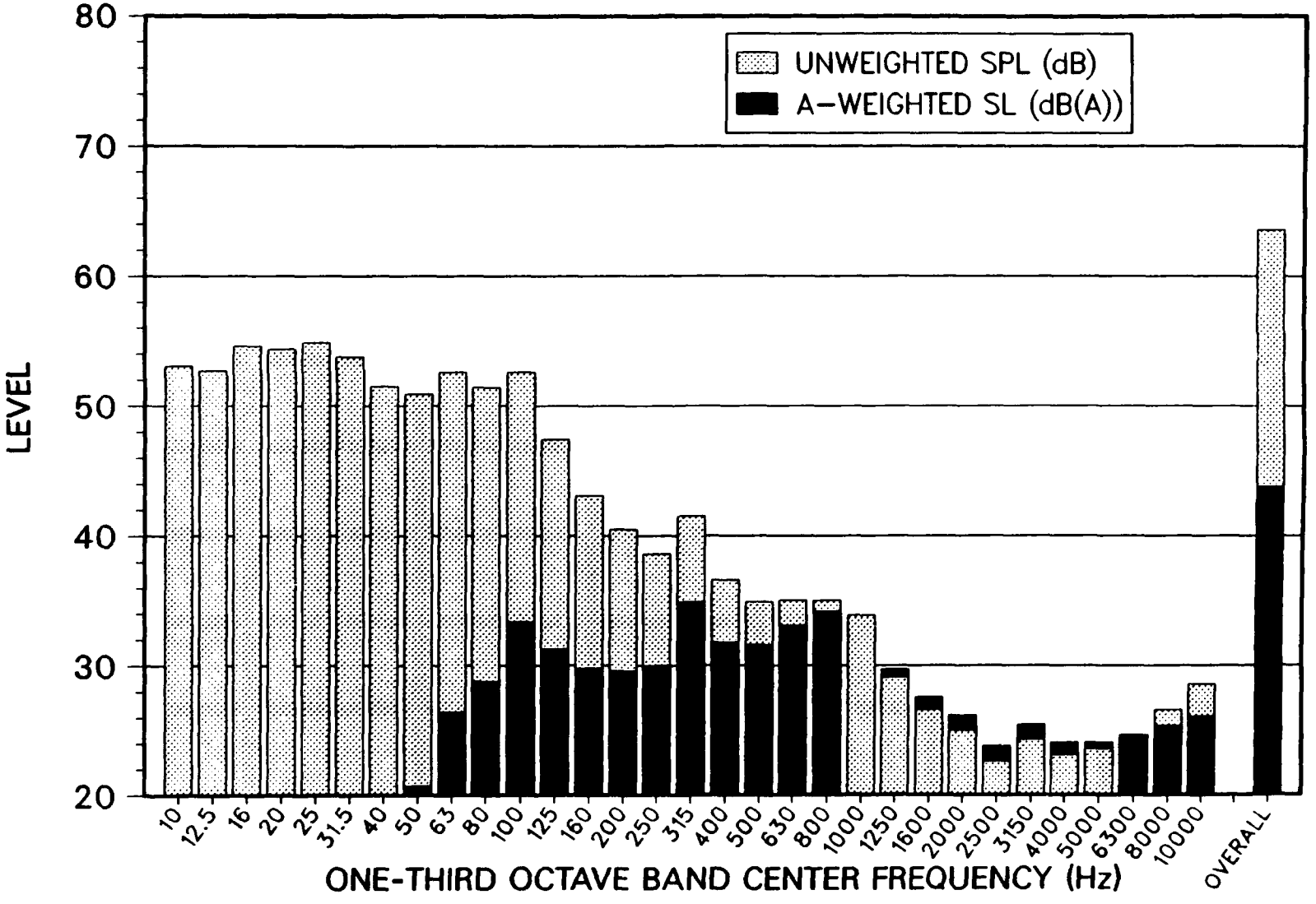
# TITLE: MILLER T-10/1&2 AFTERBURNER

| FREQ (Hz) | SOUND PRESSURE LEVEL (dB) | OCTAVE BAND SPL (dB) | A-WEIGHTED SOUND LEVEL [dB(A)] | A-WEIGHTED OCTAVE BAND SL [dB(A)] |
|---|---|---|---|---|
| 10 | 53.1 | | 0 | |
| 12.5 | 52.7 | | 0 | |
| 16 | 54.6 | 58.5 | 0 | 4.8 |
| 20 | 54.4 | | 3.9 | |
| 25 | 54.9 | | 10.2 | |
| 31.5 | 53.8 | 58.2 | 14.3 | 19.1 |
| 40 | 51.5 | | 16.8 | |
| 50 | 50.9 | | 20.7 | |
| 63 | 52.6 | 56.3 | 26.4 | 31 |
| 80 | 51.4 | | 28.8 | |
| 100 | 52.6 | | 33.4 | |
| 125 | 47.4 | 53.9 | 31.3 | 36.3 |
| 160 | 43.1 | | 29.8 | |
| 200 | 40.5 | | 29.6 | |
| 250 | 38.6 | 44.9 | 30 | 36.8 |
| 315 | 41.5 | | 34.9 | |
| 400 | 36.6 | | 31.8 | |
| 500 | 34.9 | 40.1 | 31.6 | 36.8 |
| 630 | 35 | | 33.1 | |
| 800 | 35 | | 34.2 | |
| 1,000 | 33.9 | 37.9 | 33.9 | 37.6 |
| 1,250 | 29.1 | | 29.7 | |
| 1,600 | 26.6 | | 27.6 | |
| 2,000 | 25 | 29.6 | 26.2 | 30.7 |
| 2,500 | 22.6 | | 23.8 | |
| 3,150 | 24.3 | | 25.5 | |
| 4,000 | 23.1 | 28.2 | 24.1 | 29.2 |
| 5,000 | 23.6 | | 24.1 | |
| 6,300 | 24.7 | | 24.5 | |
| 8,000 | 26.6 | 31.5 | 25.4 | 30 |
| 10,000 | 28.6 | | 26.1 | |

**••• OVERALL LEVELS (10 - 10000 Hz) •••**

**OASPL = 63.6 dB  OASLA = 43.8 dB(A)**

# TITLE: MILLER T-10/1&2 AFTERBURNER



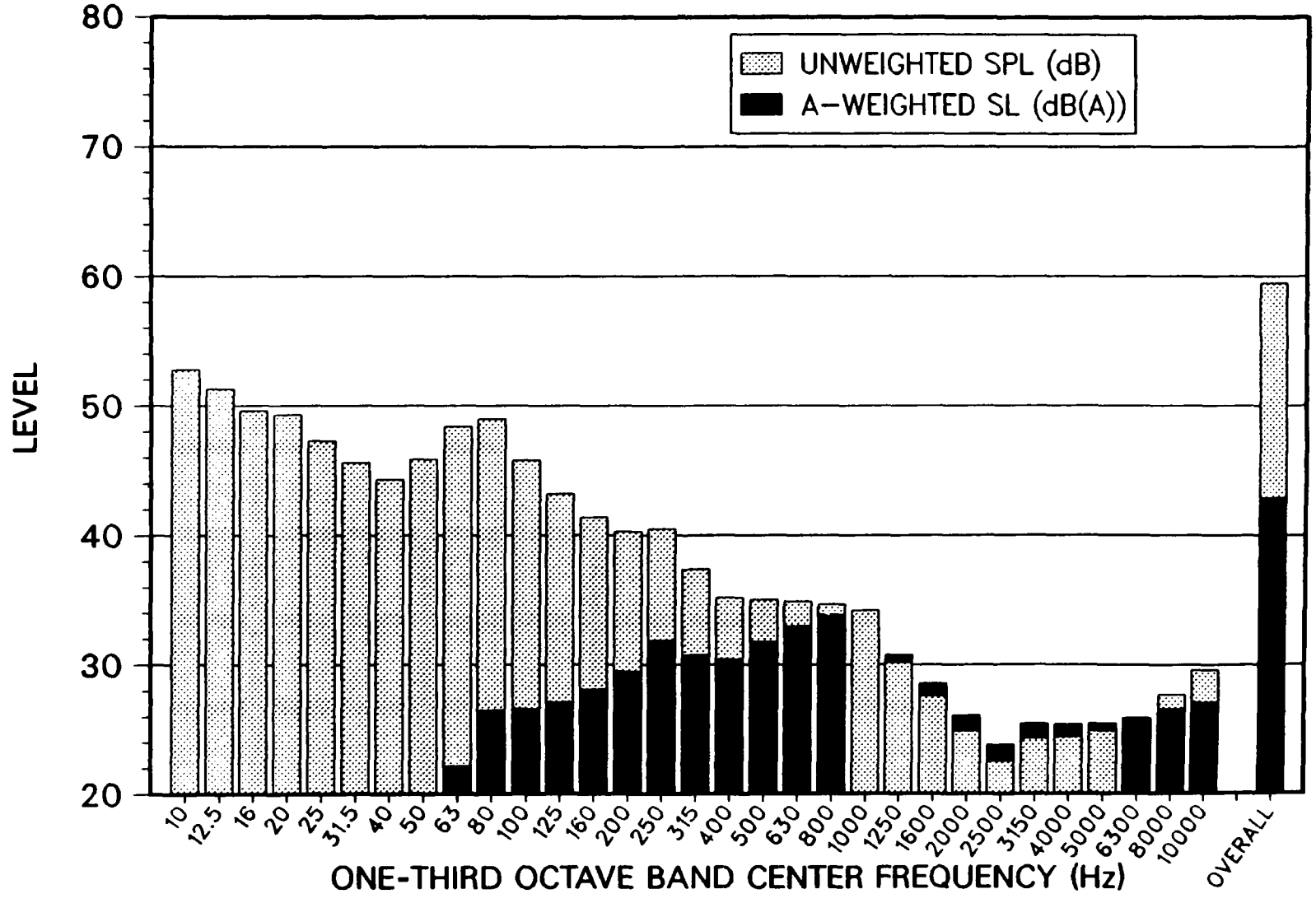
# TITLE: 1919 SEWARD DRIVE BACKGROUND

| FREQ (Hz) | SOUND PRESSURE LEVEL (dB) | OCTAVE BAND SPL (dB) | A-WEIGHTED SOUND LEVEL [dB(A)] | A-WEIGHTED OCTAVE BAND SL [dB(A)] |
|---|---|---|---|---|
| 10 | 52.8 | | 0 | |
| 12.5 | 51.3 | | 0 | |
| 16 | 49.6 | 54.7 | 0 | 0 |
| 20 | 49.3 | | 0 | |
| 25 | 47.3 | | 2.6 | |
| 31.5 | 45.6 | 50.5 | 6.1 | 11.6 |
| 40 | 44.3 | | 9.7 | |
| 50 | 45.9 | | 15.7 | |
| 63 | 48.4 | 52.5 | 22.2 | 27.9 |
| 80 | 49 | | 26.5 | |
| 100 | 45.8 | | 26.6 | |
| 125 | 43.2 | 48.4 | 27.1 | 31.9 |
| 160 | 41.4 | | 28.1 | |
| 200 | 40.3 | | 29.5 | |
| 250 | 40.5 | 44.2 | 31.9 | 35.4 |
| 315 | 37.4 | | 30.8 | |
| 400 | 35.2 | | 30.4 | |
| 500 | 35 | 39.6 | 31.8 | 36.4 |
| 630 | 34.9 | | 33 | |
| 800 | 34.7 | | 33.9 | |
| 1,000 | 34.2 | 38 | 34.2 | 37.8 |
| 1,250 | 30.2 | | 30.8 | |
| 1,600 | 27.6 | | 28.6 | |
| 2,000 | 24.9 | 30.1 | 26.1 | 31.2 |
| 2,500 | 22.5 | | 23.8 | |
| 3,150 | 24.3 | | 25.5 | |
| 4,000 | 24.4 | 29.1 | 25.4 | 30 |
| 5,000 | 24.9 | | 25.5 | |
| 6,300 | 25.9 | | 25.7 | |
| 8,000 | 27.7 | 32.6 | 26.6 | 31.1 |
| 10,000 | 29.6 | | 27.1 | |

**••• OVERALL LEVELS (10 - 10000 Hz) •••**

**OASPL = 59.5 dB  OASLA = 42.9 dB(A)**

# TITLE: 1919 SEWARD DRIVE BACKGROUND



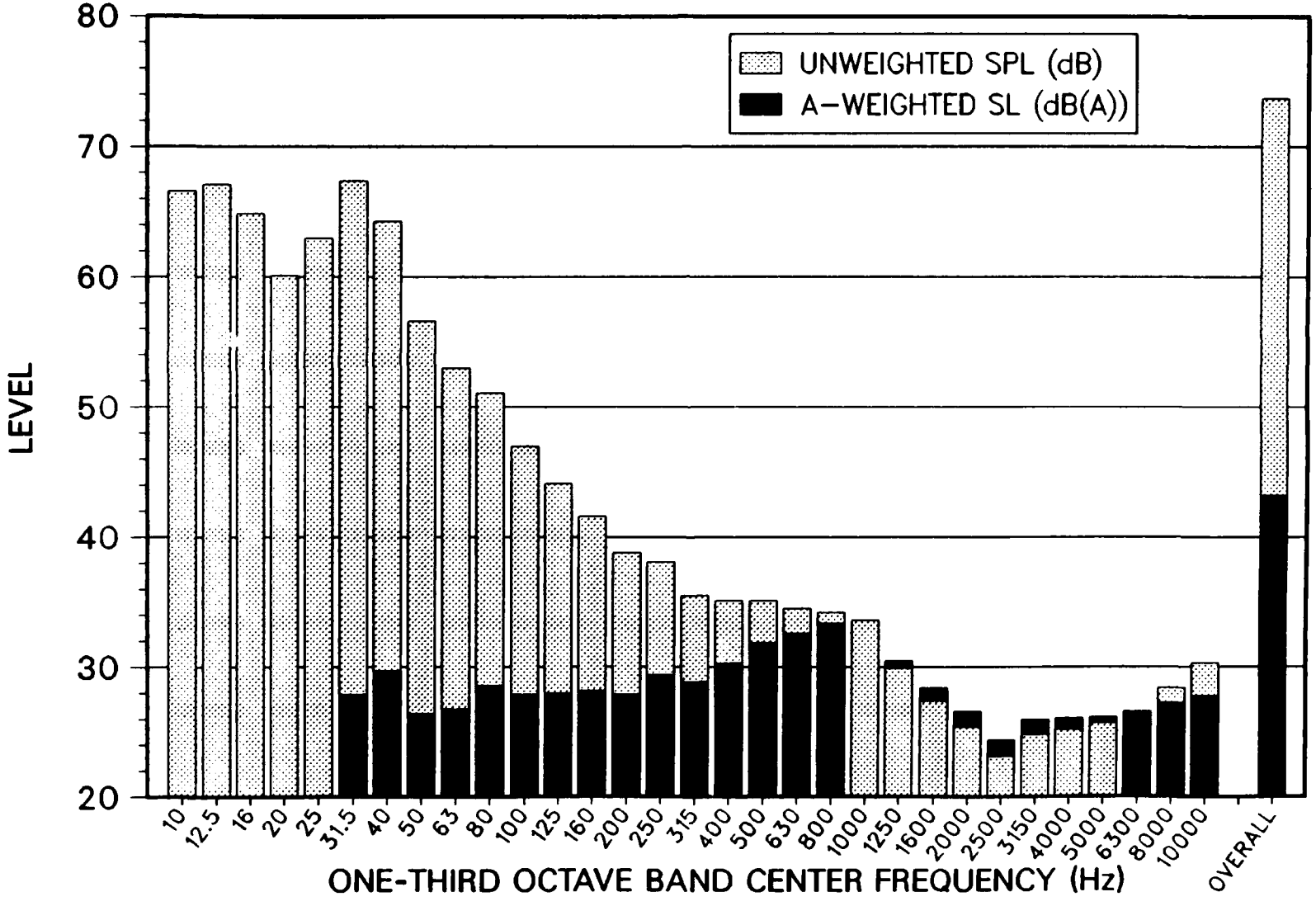
# TITLE: 1919 SEWARD DRIVE T-10/2 AFTERBURNER

| FREQ (Hz) | SOUND PRESSURE LEVEL (dB) | OCTAVE BAND SPL (dB) | A-WEIGHTED SOUND LEVEL [dB(A)] | A-WEIGHTED OCTAVE BAND SL [dB(A)] |
|---|---|---|---|---|
| 10 | 66.6 | | 0 | |
| 12.5 | 67.1 | | 3.7 | |
| 16 | 64.9 | 69.5 | 8.2 | 12.4 |
| 20 | 60.1 | | 9.6 | |
| 25 | 63 | | 18.3 | |
| 31.5 | 67.4 | 69.9 | 27.9 | 31.9 |
| 40 | 64.3 | | 29.7 | |
| 50 | 56.6 | | 26.4 | |
| 63 | 53 | 58.8 | 26.8 | 32 |
| 80 | 51.1 | | 28.6 | |
| 100 | 47 | | 27.9 | |
| 125 | 44.1 | 49.4 | 28 | 32.6 |
| 160 | 41.6 | | 28.2 | |
| 200 | 38.8 | | 27.9 | |
| 250 | 38.1 | 42.3 | 29.4 | 33.4 |
| 315 | 35.5 | | 28.9 | |
| 400 | 35.1 | | 30.3 | |
| 500 | 35.1 | 39.5 | 31.9 | 36.3 |
| 630 | 34.5 | | 32.6 | |
| 800 | 34.2 | | 33.4 | |
| 1,000 | 33.6 | 37.5 | 33.6 | 37.3 |
| 1,250 | 29.9 | | 30.5 | |
| 1,600 | 27.4 | | 28.4 | |
| 2,000 | 25.4 | 30.2 | 26.6 | 31.3 |
| 2,500 | 23.1 | | 24.4 | |
| 3,150 | 24.8 | | 26 | |
| 4,000 | 25.2 | 29.8 | 26.1 | 30.7 |
| 5,000 | 25.7 | | 26.2 | |
| 6,300 | 26.6 | | 26.5 | |
| 8,000 | 28.4 | 33.3 | 27.3 | 31.8 |
| 10,000 | 30.3 | | 27.8 | |

**••• OVERALL LEVELS (10 - 10000 Hz) •••**

**OASPL = 73.7 dB  OASLA = 43.2 dB(A)**

# TITLE: 1919 SEWARD DR T-10/2 AFTERBURNER



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